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SECRETARY WINDOM.

The tragic death of Secretary WINDOM will be felt with sorrow all over the land, and by none more than by those engaged in the mining industry. During the time that he held the office of Secretary of the Treasury he was called upon to make decisions of great importance affecting the mining interests of the country, and was thereby brought into contact with many of its representatives. He was universally found to be courteous and attentive to the demands made upon him, and whatever were his decisions no question was ever raised as to his honesty of purpose. There has never been a Secretary of the Treasury who has shown so great desire to further the mining interests of the United States as the late WILLIAM WINDOM.

The ENGINEERING AND MINING JOURNAL, though not always able to agree with the views of the late Secretary on all subjects, has been grateful to him for his honest and bold defense of the integrity of our financial status as a nation, and this against the influence of great political pressure.

We deplore his death sincerely, which, especially at this crisis in the matter of silver legislation, we look upon as a national loss, and we, along with our readers, tender our sympathy to his sorrowing family.

THE PENNSYLVANIA MINE DISASTER.

Again has there occurred one of those appalling colliery disasters which shock the whole world, this one particularly heart-rending from the large number of men whose lives were lost. The total number of the victims of the explosion in the Mammoth mine, of January 27th, was 127, and as many as 500 women and children are made widows and orphans. The explosion did its work with terrible thoroughness, and of all the men who entered the pit that morning, but two or three ever came to the surface alive. There is but one sorry consolation in the story of this awful calamity, and that is that these unfortunate beings were not obliged to give up their lives with long drawn, lingering suffering, like those of Dunbar.

The exact cause of this disaster, if it ever is known, cannot be determined amid the excitement immediately following the event. It is stated that the mine was examined on the 16th of January by the Inspector of the Second Bituminous District and its conditions reported to be "fair.' The mine had hitherto been singularly free from gas, and its ventilation was said to be good.

Whether the proper inspection of the workings had been made before the men went to their work or not, can never be determined, as the "fire boss," whose duty this was, was numbered among the victims. A serious charge, however, has been made against the company by people who claim to be in a position to know, that the second fire boss was discharged a short time ago to reduce expenses, and that the work was too much for one man to do properly, be he as faithful as man could be. If this should be the case, there is a heavy responsibility resting upon the company, and it has much for which to answer.

The responsibility for the calamity cannot be fixed at this time, however, and the only lesson taught by the facts at present known is that even in collieries which are supposed to be free from gas, well ventilated, and safe, the utmost precautions should be taken against all possible accidents.

The effect of the calamities of Dunbar and the Mammoth mine has been to call attention to the possibility of improvement in the present mining laws, and a resolution has already been passed by both houses of the Legislature of Pennsylvania authorizing the appointment of a committee, composed of members versed in coal mining, to proceed at once to the scene of the disaster, make a thorough investigation and report in what way the existing law is defective.

THE TARIFF ON LEAD ORE.

There has been such a clamor from certain districts in the Rocky Mountain States, which produce refractory and silicious ores, for the repeal of that portion of the present tariff law which prevents the free admission of Mexican lead ore into this country, that lead ore miners have already been obliged to take the defensive and prepare to resist a movement for its repeal. For this purpose a meeting of the lead-ore producers, with representatives from all the lead-producing States, was held in Denver on the 13th inst. It was not a largely attended meeting, however, and it does not appear to have been enthusiastic regarding the results of the law to the present time. The only business transacted was the formation of a permanent organization of lead-ore producers, and the issuance of a call for a general convention, to be held in Denver on February 16th.

Thus, with strange fatuity do some of the miners of the Western States persist in the course which has already worked so much injury to their industry. They are blind to the facts shown by the published statistics of the lead and silver production of the country during the past year, and blind even to the condition of affairs existing in their midst, since the law went into effect.

Although the effects of the late financial stringency are now no longer felt, and the smelting companies are again purchasing ores freely, the high treatment charges remain unchanged on silicious ores and those carrying but a small amount of lead, and in consequence there are frequent reports, from Colorado, Utah, New Mexico and other States, of mines which are stacking ore, restricting production or closing down, until there shall be a favorable change in the ore market. What a contrast does this make to the claim of the lead-tariff advocates, before the passage of the law, that "Mexican lead would be brought into the United States in such large quantities that it would force down the price of lead and thus stop the operation of a large number of mines." At the present time, after the tariff law has been in operation for less than four months, there are fewer mines in operation and the lead product of this country is less than before its passage. The price of lead has been increased, it is true, but the value of the lead product of the mines of the argentiferous lead ore producing States has fallen off from $12,261,600 to $11,558,400, a decrease of $703,200.

There never was a pernicious law which showed its injurious effects more quickly or more plainly than this. It has hurt the interests of the miners of silver-lead and dry ores; it has hurt the interests of American capital invested in mines and railways in Mexico, and it has hurt the smelting interests of this country. Whom has it benefited? Only the mining interests of Mexico, whither it has driven capital for investmen

in smelting works, the bankers and smelters of Europe and the comparatively small number of American producers of high grade lead ore, particularly lead carbonate, who have been enabled to exact abnormally high prices for their ores, which increase, of course, comes directly from the pockets of the producers of the silicious and refractory grades. Since the recent rise in smelting charges this fact seems to have become more apparent to the latter class of miners.

IRON STATISTICS AND PROSPECTS.

In our annual statistical number, January 3d, we placed the production of pig iron in the United States in 1890 at 10,260,000 net tons, the figures for the second half of the year having been estimated. The official figures published by the Iron and Steel Association, an abstract of which we give in another column, show that the actual production of pig iron in the United States during the past year was 9,202,703 gross tons, equal to 10,307,028 net tons, or only 47,028 net tons more than our estimate. The increase over the production of the country in 1889 was, consequently, more than 21 per cent., and nearly 42 per cent. greater than that of 1888.

A noteworthy feature in the tables of the Iron and Steel Association is the distribution of this great increase among the iron-producing States. From the statements which have been made concerning the growth of the pig-iron industry in the South, it has been expected that the past year would show a great increase in the production of Southern iron. The statistics show, however, that the increase there was more than equaled in Illinois and Ohio, as well as in Maryland, the latter being, from its market relations, practically a Northern State; while the increase in Pennsylvania was nearly six times that of Alabama, and twice that of all of the southern States together, including Maryland, Virginia, and West Virginia. Excluding Maryland from the list of Southern States, the production of the latter increased 17·3 per cent., against an increase in the entire country of 21 per cent. In Maryland there was an exceptionally large increase, the production rising from 33,847 tons in 1889 to 165,559 tons in 1890. This was due chiefly to the location near Baltimore of the new furnaces of the Pennsylvania Steel Company, which use ore from Cuba and coke from Pennsylvania. For this reason, aside from others, Maryland should not be classed as a Southern iron-producing State.

A matter of more immediate concern, however, which is shown by these statistics, is the great increase in stocks of unsold pig iron during the year. These, which amounted to only 277,401 net tons at the beginning of the year, had increased to 681,992 net tons on December 31st, 1890, and, as there were 59,289 net tons in warrant yards upon that date, the actual increase was 741,281 tons. The unsold stocks would undoubtedly have been much larger, moreover, had it not been for the restriction of production in Alabama in December, caused by the strike of the miners in that district.

Although consumption has been increasing rapidly during the year, it is evident that production has exceeded it by a considerable amount. The value of the stocks on December 31st must amount to something like $10,000,000, and this is likely to act as an incubus upon the trade for some time to come. Since the beginning of the present year, however, a large number of furnaces in the Mahoning and Shenango valleys have been blown out, and, although the strike in Alabama has been settled, a comparatively small number of furnaces in that district have been blown in, so that production has undoubtedly been restricted to a point more near to that of current consumption.

The lessons which the iron statistics of the past year teach are: 1st, that in the face of the comparatively low prices which have ruled during the past two years, it has been possible to increase the production of pig iron by more than 40 per cent.; 2d, that not only productive capacity but also actual production has exceeded the demand; and 3d, that with largely increased stocks and increased capacity for production, with new furnaces still building and new mines being opened, both in the United States and in Cuba, it is idle to hope for increase in selling prices for some time to come.

On the other hand, we believe that prices have fallen to about the limit to which they can go, under present circumstances, having almost reached the low level of the dull times which succeeded the panic of 1873. With prices at bottom there should be no hesitation on the part of consumers in placing their orders. The latest market reports indicate that the depressed feeling which has resulted from the financial situation of the past two months, has now practically passed away, and there is every reason to expect a normal demand for iron at present prices.

Climatological Periods.—Professor Brückner, of Berne, Switzerland, has recently called attention to the existence of climatological periods of about 35 years for the whole globe (more marked in the interior of continents). The years 1700, 1740, 1780, 1815, 1850 and 1880, says *Nature* of December 18th, appear as centers of cold, wet periods; while the years 1720, 1760, 1795, 1830 and 1860 are centers of warm, dry periods. During the warm periods the passage of oceanic air to the continent has been hindered, and during the cold it has been favored, increased rainfall occurring in the latter case.

NEW PUBLICATIONS.

MECHANICS OF ENGINEERING AND MACHINERY. By Dr. Julius Weisbach. Volume III., Part 1, Section II.: The Mechanics of the Machinery of Transmission. Second edition, revised and enlarged by Prof. Gustav Hermann. Translated by J. F. Klein, D. E. John Wiley & Sons, New York, 1890. 541 pages. Price $5.00.

The works of Dr. Weisbach have retained their position as standard text books and works of reference for nearly fifty years. The original treatise is now of but limited value in so far as it treats of actual machines, since they have been largely supplanted by more modern forms, but in its treatment of the elements of mechanics it remains equal if not superior to any modern treatise. The clear, logical style and the concise analytical method of the great German author, it would be difficult to improve upon. Consequently there is an unending succession of new editions, revisions and translations of his work, by piecemeal, as one part at a time only appears.

The present volume, translated from Hermann's Weisbach, Vol. III., Part 1, Section II., by J. F. Klein, professor of mechanical engineering at the Lehigh University, amply sustains the high reputation of the author. It treats of ropes and chains for transmitting motion, screws, including bolts and nuts, differential screws, worm gearing, etc.; crank trains, the construction of cranks, eccentrics, connecting rods, etc.; cams, engaging and disengaging gear, regulators, governors, brakes, etc. A short appendix treats of the graphical statics of mechanism.

THE LIFE OF JOHN ERICSSON. By William Conant Church. Illustrated, 2 volumes, 303 and 338 pages. Chas. Scribner's Sons, New York, 1890. Price $6.00.

In the brief preface to these volumes Mr. Church tells us that "it was the declared wish of John Ericsson that I should tell the story of his life. The executors of his estate, Messrs. George H. Robinson and Cornelius S. Bushnell, have accordingly placed in my hands all of his letters and papers. His life-long friend, Mr. John O. Sargent, has freely opened to me the letters received from Captain Ericsson during fifty years of intimate intercourse, and has given me the benefit of his recollections of the great engineer."

Captain Ericsson made a wise choice of his biographer, for Mr. Church has certainly written a very fascinating and instructive story of the great man's life. Whether the reader is of that class which reads biography for the study of character, or is an engineer who would learn the secret of Ericsson's professional greatness, these books will give him both satisfaction and entertainment.

Ericsson's life is the engineer's romance. Beginning his engineering career when 12 years of age, in 1815, as draughtsman for the Gota Canal Company in Sweden, he was a competitor of Stephenson in the great locomotive trial at Rainhill in 1829, twice revolutionized the construction of vessels of war, was the first to make a practical heat engine which obtained its power direct from coal without the use of a steam boiler, the first to make a success of the screw for propulsion of vessels, by driving it directly by the engine, without the intervention of gearing; the first to construct a steam fire engine, and the first to make a practical engine which should dispense with all forms of energy stored up in the earth and utilize directly the rays of the sun.

Ericsson's own story of his early days, found in a letter written to a relative in Sweden in 1879, is full of interest. He was born July 31, 1803. He writes: "Olof Ericsson (his father) made all possible sacrifices to give us a good education. . . . He gave free board to the talented controller who was then employed at the station of Forsock, that he might teach us drawing and the modern English style, which he executed in a manner rivaling that of the most skillful engravers. Our father also secured for us permission to draw in the office of the draughtsman of the canal company. Thus I secured the opportunity in the year 1811 to make my first drawing to scale. . . . During the winter of 1813-14 . . . he kept in his house, as a tutor for his sons, Dr. Azelius, a near relative of the celebrated chemist. . . . As early as the summer of 1815 Captain Edstrom commissioned me to make drawings for the archives of the Canal Company, and in the year 1816, at the age of thirteen, I was assistant leveler at the station of Riddarhagan. . . . In 1818 . . . I secured the position of leveler. . . . When I entered the Swedish army in 1820, at the age of seventeen, I would not have exchanged my knowledge for that possessed by any of the youth who had passed their time at the University. When I arrived in England, at the age of twenty-two and three-quarter years, I was not only equal but superior to the English engineers in acquired skill. This brief account should be sufficient to refute the accusation that Olof Ericsson neglected the education of his sons."

Glancing rapidly at some of his most important achievements, we find that as early as 1827 Ericsson had applied a surface condenser to the engine of the steamer "Victory," with which Sir John Ross attempted to make the Northwest passage. In 1828 he invented the modern steam fire engine, but such was the conservatism of the English authorities that it was condemned and a land steam fire engine was not used in London until 1860. In 1829 he was the principal rival of Stephenson in the great contest at Rainhill when the Rocket established the success of steam locomotion. Ericsson's locomotive, the Novelty, proved far superior to the Rocket in speed, but minor defects in its workmanship, due to the short time in which it was built, only seven weeks, prevented its completing the required distance of 70 miles. The biographer says: "Had the workmanship been as strong as the design was original the prize would have been won by the Novelty and the early history of railways would have assumed a different complexion."

In 1832 he patented a rotary steam engine, which a memorandum among his effects states "proved a complete failure when put to trial."

Ericsson patented his "caloric engine" with an "organ-pipe regenerator," consisting of a faggot of small copper tubes, in 1833. An engine of five horse power, with a working piston 14 inches in diameter, was exhibited in London in 1833, and became the sensation of the day in scientific and mechanical circles. Practical difficulties, however, delayed the actual success of the caloric engine for many years.

In 1833 Ericsson was also engaged in experiments on submerged propellers for steam vessels, and a letter to John Bourne, published in 1875, states that in 1835 he designed a rotary propeller to be actuated by steam power, "consisting of a series of segments of a screw." In 1836 he con-

structed a small propeller boat. In 1837, he says: "Designed an engine for imparting motion directly to the screw-propeller shaft, consisting of two steam cylinders placed diagonally at right angles to each other, the connecting rods of which were coupled to a common crank pin." This engine was applied in the year 1838 to the iron screw steamer 'Robert F. Stockton,' which crossed the Atlantic under canvas, 1839, and was afterward employed as a tug-boat on the Delaware River for upward of a quarter of a century."

This last, says Mr. Church, was the first direct-acting screw-propeller engine ever built. In 1866 the librarian of the British Patent Office wrote to Ericsson, expressing a desire to purchase the original engines of this vessel to place them in the Patent Office Museum. The vessel was then in the possession of the Messrs. Stevens, of Hoboken, and Ericsson endeavored to obtain the engines, but without avail.

In 1873 he wrote: "Nothing could induce the Messrs. Stevens, who claim to be the originators of screw propulsion, to permit the machinery of the real pioneer screw vessel to be placed in your museum. . . . The machinery was broken up and put into the melting pot. So careful were the parties mentioned to prevent the smallest part to remain as a proof that the remarkable vessel once existed that 'not a vestige now remains,' says my informant, who has access to the premises where the vile act of destruction took place."

There must be another side to this story, which its publication will be likely to bring out, but we think that Mr. Church is scarcely fair to the Messrs. Stevens, who certainly preceded Ericsson in experiments on screw propulsion, although they did not succeed in bringing the screw into practical use. Ericsson is, no doubt, entitled to this credit; but as early as 1804 John Stevens built a steam vessel driven by *twin* screws, and the machinery is preserved in the museum of the Stevens Institute of Technology.

In 1837, a year before the building of the "Stockton," Ericsson launched on the Thames the "Francis B. Ogden," a screw steamer 45 feet long, and he invited the Lords of the British Admiralty to an excursion in tow of this vessel. The trip was entirely successful, from an engineer's standpoint, but their lordships were disappointed. Robert F. Stockton, of New Jersey, who was one of the party, immediately comprehended, however, the revolution the screw steamer was destined to work in naval warfare, notwithstanding the opinions of the officials of the British navy. He at once ordered two iron boats for the United States to be fitted with the steam machinery and propeller. So persuaded was he of the great importance of the propeller for war vessels that he assured Ericsson that the government of the United States would test it on a large scale, and so confident was Ericsson that Captain Stockton would accomplish what he promised that he at once abandoned his professional engagements in England and set out for the United States in November, 1839.

Stockton did not succeed in getting a screw vessel ordered by the United States Government till 1841, but in the meantime the inventor found abundant employment for his inventive skill. In 1840 he obtained the gold medal of the American Institute for the best plan of a steam fire engine, and he soon applied his propeller to several merchant vessels; one was built in 1839, six in 1841, nine in 1842, and 26 in 1843. In 1841 Captain Stockton received orders to superintend the building of the "Princeton" for the U. S. Navy, at the Navy Yard in Philadelphia, the first war vessel to which the screw was applied. Ericsson had given Stockton the model and plans for this vessel in 1839, before he left England; and after the order to build was given he furnished 124 working drawings, and devoted to the vessel two of the best years of his life. But Ericsson was no business man and had no agreement for compensation from the government for his plans. He wrote to Stockton in 1841: "Whenever the efficiency of the intended machinery of the steam frigate shall have been duly tested, I shall be satisfied with whatever sum you may please to recommend or the government see fit to pay for the patent right." Stockton made him a partial payment of $1,150, and this was all that Ericsson received for either services or patent right on that vessel. He sent an itemized bill for $15,080 to the Secretary of the Navy covering his *per diem*, traveling expenses, and services as an inventor. The bill was referred to Captain Stockton, and by him reported back adversely, in a long and most extraordinary letter, in which he refers to Ericsson in these words: "Having thus thrust himself upon me, and believing him at that time to be a mechanic of some skill, I did not employ him, but I permitted him, as a particular act of favor and kindness, to superintend the construction of the machinery of the 'Princeton,' on the success of which he had placed so much of his future hopes and anticipations."

Ericsson then made an appeal to Congress with such effect that the Naval Committee of the House of Representatives unanimously reported a bill to pay Ericsson $15,080, but it was defeated by a narrow majority. In 1856 the Court of Claims, on a reference from the Senate, reported in favor of paying him the amount, less the $1,150 he had received from Stockton, and the Senate Committee then reported in favor of paying that sum. There the matter rested from that day to this, and Ericsson's claim still remains unpaid. His labors reduced him to poverty, and at the end of 1849 his check book showed a balance of $132, with the legend written in Swedish, "A beautiful balance indeed to start the new year with. One gives much for little as he grows older and more used-up."

He was a spendthrift on his own inventions. He built eight experimental caloric engines between 1840 and 1850, costing $16,400. He soon reaped a return for this expenditure, however, selling a tenth interest in his foreign patents on the caloric engine for $10,000 and two-tenths of the American patents for $11,000.

Ericsson's next great undertaking was the building of the caloric ship "Ericsson" in 1852. The cost of the vessel was about half a million dollars, the caloric engines costing $130,000. In 1875 he wrote concerning it, "There was more engineering in that ship than in ten 'Monitors.' I regard the hot-air ship as by far my best work; it was simply a mechanical marvel." The ship, however, was a commercial failure. It demonstrated the limitations of the caloric engine, and showed that it was useful only for small powers. The vessel on one of its trial trips in New York Bay on April 27th, 1854, developed a speed of 11 miles an hour, without putting forth her maximum power, when she was suddenly struck by a tornado, careened over so as to put under water the ports which had been left open, and sunk in a few minutes. The vessel was afterwards raised and converted into a steamer.

Ericsson then turned his mind to the building of caloric engines for small powers, and a thousand of them were sold within two years. In 1870 he wrote that the caloric patent had yielded more than $100,000.

The "Monitor," which so suddenly burst upon the astonished vision of the world in 1862, had been in Ericsson's mind since 1826. From that date to 1861 he kept it a profound secret, except that in 1854 he partially communicated his ideas to Napoleon III. The latter was not sufficiently impressed with the ideas to make use of them, and they did not see the light of day for seven years more. His motive, as he explains, for offering them to the United States Government in 1861 "was that of serving the Union cause." The story of the "Monitor" has often been told and we need not here refer to it further than to note that Mr. Church rightly devotes several chapters to it, and tells it more fully and more vividly than any previous writer.

Had Ericsson died in 1862 he would have gone down into history as the greatest inventor of the century, but he lived 26 years longer, and every year was as full of work as any that had preceded it. He contributed his share to the questions of harbor defense, gunnery, submarine vessels, guns and torpedoes, sub-aquatic warfare, as he called it; made researches into the difficult problem of the sun's temperature and energy, experimented in the line of steam engineering, studied the possibilities of using the tides as a source of power, developed the modern form of caloric pumping engine, and, finally, spent a great portion of the last 20 years of his life in inventing and perfecting the details of his sun motor. He made the latter a mechanical success, obtaining one horse power from 10 square feet of reflecting surface.

In a letter published in *Nature*, August 2d, 1888, seven months before his death, he said: "The new motor being thus perfected and first-class manufacturing establishments being ready to manufacture such machines, owners of the sunburnt lands on the Pacific coast may now with propriety reconsider their grand scheme of irrigation by means of sun power." In another letter he says: "You will probably be surprised when I say that the sun motor is nearer perfection than the steam engine, but until the coal mines are exhausted its value will not be fully acknowledged. Nevertheless, they will even now use on the west coast of South America the new power, whose fuel can be obtained without expense or charge for transportation." So it may yet happen that the great fame of Ericsson will not be that he invented the "Monitor," but that he reclaimed the wastes of the earth by utilizing the rays of the sun as mechanical power.

Of Ericsson's personal characteristics and his eccentricities, his biographer treats quite fully. They have often been written about in recent years and space will not admit of further reference to them here.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and that of book buyers, give the retail price?—These notices do not supersede review in another page of the Journal.]

Annual Report of the Geological Survey of Arkansas for 1888. *The Geology of the Coal Regions. Vol. III.* By John C. Branner, Ph. D., State Geologist. Published by Press Printing Company, Little Rock, Arkansas.

Eighteenth Annual Report of the Geological and Natural History Survey of Minnesota. By N. H. Winchell, State Geologist, Minneapolis, March 3d, 1890.

Tenth Annual Report of the State Mineralogist, for the year ending December 1st, 1890. By the California State Mining Bureau, Wm. Irelan, Jr., State Mineralogist, pp. 983. Printed at the State Printing Office, Sacramento, 1890.

The Metallurgy of Steel, by Henry Marion Howe, A. M.(Harvard), S. B. Vol. 1. Second edition, revised and enlarged. The additions describe some recent advances in the processes of making steel directly from the ore. The Scientific Publishing Company, 27 Park Place, New York, 1891. 392 pp., 232 illustrations and 225 tables and diagrams. Price $10.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
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The Verrugas Viaduct.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In justice to the late Mr. Evans, the following statement regarding the destruction of the old Verrugas Viaduct, described in your last issue, should be made. The engineer's profiles, which were sent to Mr. W. W. Evans, indicated that a bridge of the description sent out for the place would fit the site reasonably well. The letter accompanying the profiles stated that the material was as good as rock. This was true. It was not supposed at the time that a pier in the bottom would be in any danger. In grading the approaches, material from the enormous cuts at each end was dumped into the bottom. Consequently it was necessary to dig and wall-in a hole for the middle pier, while a cut was made around the pier to allow the water to flow. The wholly unexpected flood of mud and stones that came down could not have been guarded against in any way. It simply had to have the whole bottom space, and took it. Mr. Evans was an able man, and took great pride in American engineering. He took pride in the Verrugas Viaduct, and it is but just to his memory that the above circumstances should be published. The cost of the new bridge has been put at $500,000. I have not the full accounts of the cost as yet, but it will not be one-fourth of that amount.

18 Broadway, New York City, Jan. 27, 1891. LEFFERT L. BUCK.

The Largest Crane.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In the issue of the ENGINEERING AND MINING JOURNAL of November 8th, 1890, one of your esteemed readers endeavors to rectify the assertion made concerning the large crane built for the 12-inch-gun shop in the United States Navy Yard, Washington, D. C., and to prove his correction gives a cut of the 150-ton crane at the Gruson Works at Magdeburg, and also at the Italian Government Works at Spezia. These Gruson cranes are novel, but they differ in character and construction from our large government crane as much as day from night. They are operated by hydraulic power, and have a lift of only six (6) to

eight (8) feet; they have steel rams and cylinders and cast-iron casing surrounding the cylinders proper, which are used for the purpose of carrying water diluted with special chemicals to prevent freezing. The general design is on the Gantry principle of construction, viz., the crane carried on rails secured to ties resting on ground level. This Gantry hydraulic crane has double trolleys traversing the crane bridge, without hoisting machinery, being simply wheels to carry beam, sling and anchor hooks. Each trolley is also moved by endless chains to adjust distance apart on the bridge for the various widths of the loads to be raised, and the manipulation of the motions of these trolleys is accomplished by hand power through endless chains, as on the jib cranes. When hoisting the enormous chilled domes for turret covers, these trolleys are separated by a distance nearly two-thirds of the span of crane, thus dividing the enormous load to be lifted over a greater area of crane bridge and more directly near lifting rams of bridge. All this is done at very slow speed in order to hoist crane bridge and load as nearly level as possible.

Compensating arrangement for deflection of crane bridge at either end is provided by suspending the bridge to side links secured to a separate head on each ram, which revolves in order to allow freedom for traveling of the carriage which supports the trucks on the rail. This crane has one slow speed only for hoisting by hydraulic power, one slow speed for racking each trolley to and fro on bridge, and this by hand power; and one slow speed for travel of the crane which is driven by power. Two men are required for its manipulation.

The 110 gross tons overhead traveling crane built for the 12-inch-gun shop of the United States Navy Yard, Washington, D. C., is so far as I know, the largest overhead crane in the world at this date. The full power of this crane is to lift 150 tons 41 feet high at one foot per minute, and while hoisting, if necessary, to travel across bridge 50 feet per minute, and longitudinally, 60 feet per minute. Its span is 61 feet 8 inches. The crane has six different rates of speed for hoisting which are as follows: 150 tons, one foot per minute; 75 tons, two feet; 37½ tons, four feet; 18¾ tons, eight feet; 10 tons, fifteen feet; 5 tons, thirty feet.

There are two changes of speeds for traverse of trolley, viz.: 25 and 50 feet per minute, and two changes of speeds for longitudinal travel of crane, viz.: 30 and 60 feet per minute.

The total weight of crane complete is about 200 tons; the total weight of crane on track is about 185 tons; height of track, above floor level, 40 feet; height of roof chord, above floor level, 56 feet 6 inches; total rolling load, 40 feet high, about 670,000 pounds, or 335 tons. The entire crane is manipulated by one intelligent man and with seven levers each, requiring but 30 pounds pull; all are grouped within reach of the operator as he sits on chair. Every motion is provided with automatic devices to prevent over-travel, hoisting or accident of any kind that might be caused through carelessness.

JNO. R. MORGAN.
Chief Engineer, Morgan Engineering Company.

ALLIANCE, O., Dec. 12, 1890.

The Atlantic & Pacific Railway Tunnel Company.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I notice a glowing advertisement of "Brick" Pomeroy's great tunnel scheme in the JOURNAL of 24th inst., and knowing the care with which you investigate unsound enterprises, and the fearless manner in which you expose them, I beg to ask you, in the interest of unsuspecting investors, and especially of the workmen who are invited to invest their savings and services in this scheme, to look into this matter and let your readers know the result. To me the advertisement has a decidedly "fishy" smell, and the reputation of its promoter may leave something to be desired.

So far as it may be a railroad scheme the question is simple enough; the tunnel should be driven for $1,250,000 to $1,500,000, and the advertisement gives no limit to the number of bonds to be issued, while the stock amounts to no less than $7,000,000, to be sold for $3,500,000, and presumably the proceeds of the stock goes into the hungry pockets of "Brick" Pomeroy.

Apparently the advertisement is aimed to catch the workmen, farmers of Kansas, Nebraska and Colorado, who have already had a bitter experience with this promoter, and the miners of Colorado, who I think are too intelligent and experienced in this kind of mining gamble to take a hand in it.

To any one in the least acquainted with mining the "250 fissure veins" picture is enough to induce incredulity in the statements which follow the section, but this warning may be necessary for the guidance of the "tenderfeet" and the "lambs" of Wall street.

GRANITE.

NEW YORK, Jan. 26, 1891.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I notice an advertisement upon page ii of the ENGINEERING AND MINING JOURNAL, January 24th, of the Atlantic & Pacific Tunnel Company with some of the early history of which I am familiar. The tunnel was commenced somewhere about 1880, as stated in the advertisement, and was intended, first, to form a communication between the Atlantic and Pacific seaboards; second, to prospect for silver veins, and third, and most important, to put money into the hands of the operators of the scheme. The basis of the whole affair consists in one or two mines, located on Kelso Mountain, together with numerous prospects, which were furnishing, some few years ago, a small amount of silver-bearing galena, which was shipped to the sampling works in Georgetown. On the west side of Grey's Peak some small prospects had been discovered, but nothing of permanence or value upon the mountain, the cross-section of which shows such an elaborate display of mythical mineral wealth.

The Union Pacific Railroad, coming up from Denver, passing through Georgetown, runs up the gorge, making its celebrated loop, and on up the valley for a distance of about six miles west of Georgetown, where it ends. On the west side the Blue River branch of the Denver & Rio Grande Railroad runs up Montezuma Gulch, coming from Leadville.

The management during its early days was not of such a character as would tend to give it a reputation as an enterprise conducted with ability and candor of purpose, many false reports being given out at that time as to the strikes of galena that were made in the tunnel.

Knowing your well-determined effort to exclude from your paper advertisements of a doubtful class, I write this to call your attention to it, and suggest that the matter receive the thorough investigation that you are capable of giving it.

LEVEL.

CHICAGO, January 27th.

ROPE-DRIVING.*

By Charles W. Hunt, New York City.

The transmission of power by cotton or manilla ropes was a few years ago an experiment. It passed the experimental stage and its use has spread with remarkable rapidity, both in England and the United States, and promises, at the present rate of increase, to become a formidable competitor with gearing and leather belting for use where the amount of power is large or the distance between the power and the work is comparatively great. The most prominent questions which the engineer, who proposes to make an application of rope driving, wishes to have answered are those relating to the horse power, wear of rope, first cost of rope and catenary.

These questions cannot be answered with precision in a general article, but it is the purpose of this paper to give the general limitation of this method of transmitting energy in order that an engineer may make a close approximation, and then, in the case of a large installation, make such supplementary calculations as the importance of the case demands. It will be assumed that the conditions are favorable to this mode of driving, leaving abnormal cases for such special treatment as the engineer may at the time think best to use. The subject is so new that but few accurate data are available, arising from the long period required in each experiment, a rope lasting from three to six years. In many of the early applications so great a strain was put upon the rope that the wear was rapid, and success only came when the work required of the rope was greatly reduced. The strain upon the rope has been decreased until it is approximately

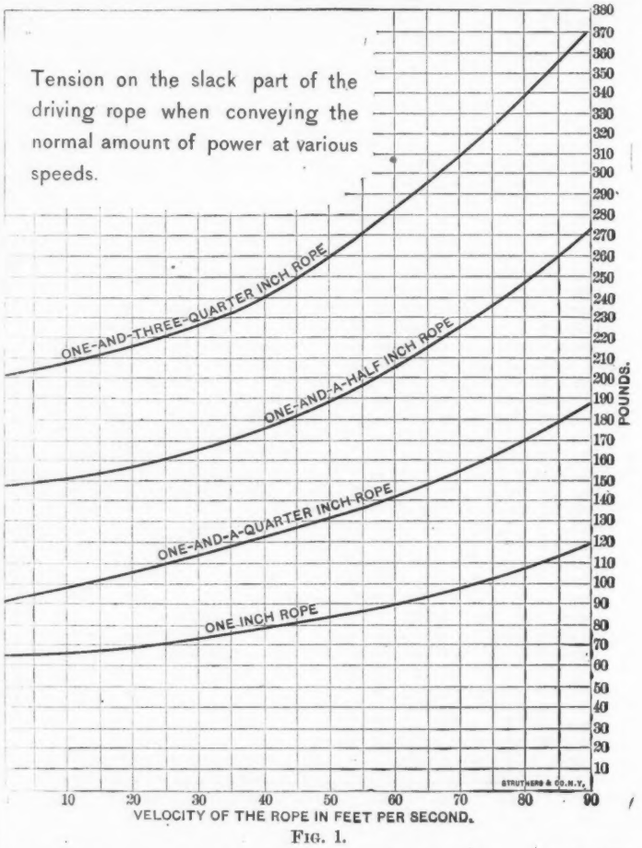

Tension on the slack part of the driving rope when conveying the normal amount of power at various speeds.
ONE-AND-THREE-QUARTER INCH ROPE
ONE-AND-A-HALF INCH ROPE
ONE-AND-A-QUARTER INCH ROPE
ONE INCH ROPE
POUNDS.
VELOCITY OF THE ROPE IN FEET PER SECOND.
STRUTHERS & CO. N.Y.

FIG. 1.

known what it should be to secure reasonable durability. Installations which have been successful, as well as those in which the wear of the rope was destructive, indicate that 200 pounds on a rope one inch in diameter is a safe and economical working strain. When the strain is materially increased, the wear is rapid. For the purpose of this paper, this strain of 200 pounds for the normal fibre stress of a manila rope one inch in diameter will be assumed to be the one which it is advisable to use, and the horse power and relative wear at different speeds will be estimated. Farther experience may modify this assumption, but at the present time it is the best obtainable, and the changes which may be made hereafter will affect but slightly the estimates here given.

To ascertain the average breaking strength of commercial rope, I lately purchased four pieces made by different cordage works and had them tested on the Fairbanks testing machine in New York. They varied slightly in diameter, but when reduced to the equivalent of a rope one inch in diameter, had an average breaking strength of 7,140 pounds. Expressed algebraically, the breaking strength, weight per foot and the working strains are:

$$W = 720\ C^2\ (1);\ P = \cdot 32\ C^2\ (2);\ w = 20\ C^2\ (1)$$

in these and the following equations:

C = Circumference of rope in inches.
D = Sag of the rope in inches.
F = Centrifugal force in pounds.
g = Gravity.
H = Horse power.
L = Distance between pulleys in feet.
P = Pounds per foot of rope.
R = Force in pounds doing useful work.
S = Strain in pounds on rope at pulley.
T = Tension in pounds of driving side of the rope.
t = Tension in pounds on slack side of the rope.
v = Velocity of the rope in feet per second.
w = Working strain in pounds.
W = Ultimate breaking strain in pounds.

*Abstract of a paper presented at the Richmond meeting of the American Society of Mechanical Engineers.

This makes the normal working strain equal to one-thirty-sixth of the breaking strength and about one-twenty-fifth of the strength at the splice. The actual strains are ordinarily much greater, owing to the vibrations in running, as well as from imperfectly adjusted tension mechanism.

We will assume that the strain on the driving side of a rope is equal to 200 pounds on a rope 1 inch in diameter, and that the rope is in motion at various velocities of from 10 to 140 feet per second. Under this assumption, we will have in all cases a fibre strain of 200 pounds on the driving side of a 1-inch rope, and an equivalent strain for other sizes.

The centrifugal force of the rope in running over the pulley will reduce the amount of force available for the transmission of power. The centrifugal force of the rope is computed by the formula:

$$F = \frac{P v^2}{g} \qquad (2)$$

At a speed of about 80 feet per second, the centrifugal force increases faster than the power from increased velocity of the rope, and about 140 feet per second equals the assumed allowable tension of the rope. Computing this force at various speeds and then substracting it from the assumed maximum tension, we have the force available for the transmission of power. The whole of this force cannot be used, because a certain amount of tension on the slack side of the rope is needed to give adhesion to the pulley. What tension should be given to the rope for this purpose is uncertain, as there are no experiments which give accurate data, and at the present time a decision must be made partly from analogy and partly from experience.

If the rope be considered as a belt on a plain pulley, the friction would be substantially the same as a leather belt at the same tension; but as ropes are frequently lubricated to reduce the wear, the coefficient of friction must be materially reduced. There have been no experiments to decide with accuracy what this reduction is, but it is known from considerable experience that when the rope runs in a groove whose sides are inclined toward each other at an angle of 45° there is sufficient adhesion when the ratio of the tension is

$$\frac{T}{t} = 2 \qquad (3)$$

For the present purpose T can be divided into three parts: Tension doing useful work, tension from centrifugal force, tension to balance the strain for adhesion. The tension t can be divided into two parts: Tension for adhesion, tension from centrifugal force.

It is evident, however, that the tension required to do a given work should not be materially exceeded during the life of the rope.

There are two methods of putting ropes on the pulleys; one in which the ropes are single and spliced on, being made very taut at first, and less so as the rope lengthens, stretching until it slips, when it is respliced. The other method is to wind a single rope over the pulley as many turns as needed to obtain the necessary horse power and put a tension pulley to give the necessary adhesion and also to take up the wear. The tension t required to transmit the normal horse power for the ordinary speeds and sizes of rope is given in Fig. 1, computed by formula 6. The total tension T on the driving side of the rope is assumed to be the same at all speeds. The centrifugal force, as well as an amount equal to the tension for adhesion on the slack side of the rope, must be taken from the total tension T to ascertain the amount of force available for the transmission of power.

I have assumed that the tension on the slack side necessary for giving adhesion is equal to one-half the force doing useful work on the driving side of the rope; hence the force for useful work is:

$$R = \frac{2(T - F)}{3} \qquad (4)$$

and the tension on the slack side to give the required adhesion is:

$$\frac{(T - F)}{3} \qquad (5)$$

Hence,

$$t = \frac{(T - F)}{3} + F \qquad (6)$$

The sum of the tensions T and t is not the same at different speeds, as the equation (6) indicates.

As F varies as the square of the velocity, there is, with an increasing speed of the rope, a decreasing useful force, and an increasing total tension, t, on the slack side.

With these assumptions of allowable strains, the horse power will be:

$$H. = \frac{2\,v\,(T - F)}{3 \times 550} \qquad (7)$$

Transmission ropes are usually from one to one and three-quarter inches in diameter. A computation of the horse power for four sizes at various speeds and under ordinary conditions, based on a maximum strain equivalent to 200 pounds for a rope one inch in diameter, is given in Fig. 2. The horse power of other sizes is readily obtained from these. The maximum power is transmitted, under the assumed conditions, at a speed of about 80 feet per second.

The first cost of the rope will be smallest when the power transmitted by it is greatest, and, under the assumed conditions, will be a minimum for a given power when the velocity of the rope is about 80 feet per second. The ratio of the first cost of the rope running at any other speed will be:

$$\text{Ratio of first cost} = \frac{H. \text{ at 80 feet per second}}{H. \text{ at required speed.}} \qquad (8)$$

The wear of the rope is both internal and external; the internal is caused by the movement of the fibres on each other, under pressure in bending over the sheaves, and the external is caused by the slipping and the wedging in the grooves of the pulley. Both of these causes of wear are, within the limits of ordinary practice, assumed to be directly proportional to the speed. Hence, if we assume the coefficient of the wear to be k, the wear will be kv, in which the wear increases directly as the velocity, but the horse power that can be transmitted, as equation (7) shows, will not vary at the same rate.

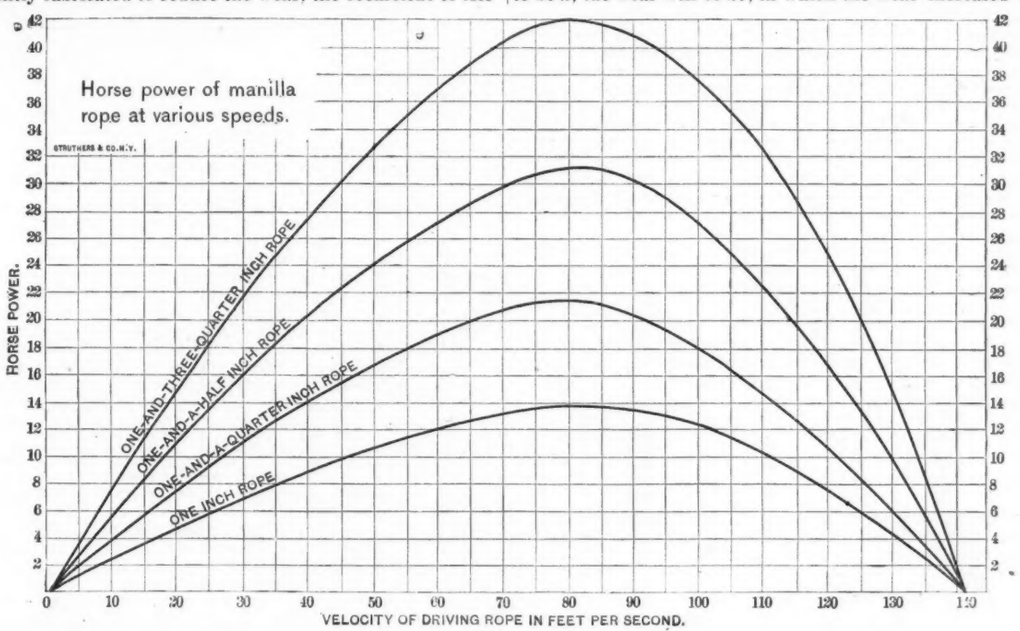

Horse power of manilla rope at various speeds.
STRUTHERS & CO. N.Y.
ONE-AND-THREE-QUARTER INCH ROPE
ONE-AND-A-HALF INCH ROPE
ONE-AND-A-QUARTER INCH ROPE
ONE INCH ROPE
HORSE POWER.
VELOCITY OF DRIVING ROPE IN FEET PER SECOND.

FIG. 2.

If we divide the value for wear at a given speed by the horse power that the same rope will transmit at other speeds, we get the relative wear of the rope in transmitting one horse power. The higher the speed, up to about 80 feet per second, the more power will be transmitted, but it is accompanied by a more than equivalent wear.

The rope is supposed to have the strain T constant at all speeds on the driving side, and in direct proportion to the area of the cross section; hence the catenary of the driving side is not affected by the speed or by the diameter of the rope.

The deflection of the rope between the pulleys on the slack side varies with each change of the load or change of the speed, as the tension equation (8) indicates.

The deflection or sag of the rope may be computed for the assumed value of T and t by the parabolic formula:

$$S = \frac{P\,L^2}{8\,D} + P\,D, \qquad (9)$$

S being the assumed strain T on the driving side, and t, calculated by equation (6), on the slack side.

It is to be regretted that accurate data are not available to determine the constants needed in the equations for wear and for friction on the pulley. No estimate has been made, as this paper is intended to state the general limitations of this mode of transmitting energy rather than to give details of its application.

The Electro-Deposition of Aluminum.—For this purpose a saturated solution of persulphate of aluminum requiring a temperature of about 180° to 200° Fahrenheit to prevent crystallization is employed. The anode is aluminum having incorporated with it a separating substance affected neither by the current nor by the solution. This is prepared by melting the aluminum in a crucible, and stirring in about 30% of carbon or some other similar substance. Carbon has been found to be preferable, and the union, which is probably largely mechanical, is facilitated by the presence of a small quantity of hydro-carbon. The process described is claimed to give a dense metallic deposit of aluminum.

THE RUSSELL PROCESS AT THE SOMBRERETE MILL.

By E. H. Russell.

The following is an account of a series of experiments to determine the best mill methods to be pursued in the treatment of Sombrerete ore, and to decide what changes might be necessary in the new plant.

The experiments were confined to ore from the San Francisco mine, an approximate analysis of which was as follows: FeS_2, 40%; ZnS, 12%; PbS, 13%, and insoluble residue, 34%. The blende assayed 80 ounces silver per ton; the galena, 70 ounces, and the pyrite, 35 ounces.

The experiments made included some which had never been tried elsewhere, and each series was carried to its limit in every direction. The attainment of best results, however, in the roasting department, and consequently in the leaching, was hindered by irregularity in the supply of crushed ore for the furnace, on account of delays in the crushing department. These interruptions amounted to 14 or 16 hours per day throughout the series of experiments. The thoroughness of the leaching work done in the mill, however, was such that the average apparent mill extraction, in the whole 127 charges (40 tons each) treated, exactly equaled the result of the assay-office leaching test on the samples of these charges, and for the last 10 of the 13 mill runs exceeded the assay-office results 1·4%.

The actual running time of the Sombrerete mill, for these experiments, was 93 days, and the total net tons of ore crushed, including that crushed by stamps at the Hacienda Grande, was 4,935 tons. The number of vat charges treated in the leaching department was 127, averaging 40 tons each. The whole series of experiments was divided into three sections, according to the general method pursued in the roasting, as follows:

(1) *Furnace Roasting without an Air Blast and without a Preliminary Field Roasting.*—Starting with a 60-mesh screen for ore and 30-mesh screen for salt, this run ended with a 24-mesh screen for ore and a 12-mesh screen for salt. All the ore of this run was crushed by rolls. The salt was dried and crushed and added to the raw ore before reaching the furnace. This being a sort of preliminary run, the amount of ore treated was only 545 tons. The loss of silver by dust from machinery and furnace and by volatilization in furnace was 24·1%, and the actual clean-up in the leaching department, based on roasted-ore weights and values, was 30·1%, although the apparent extraction (computed from the value of ore and tailings) was 54·1%. During the experiments of this section the furnace was run for three days without using any salt with the ore, and for seven days with open hopper in the shaft, allowing the ore to fall directly through and out of the furnace into the cooling floor cars.

This run demonstrated that the ore could probably be successfully treated if crushed sufficiently fine, that is, through a 60-mesh screen with rolls or 30-mesh screen with stamps, the extraction, before lying on cooling floor, on such ore roasted with salt being 91·3% on ore from the shaft, 90·3% from the return flue, and 95·5% from the dust chambers. The results of roasting without salt, before lying on the cooling floor, were 64·4% on ore from the shaft and 61·5% on ore from the return flue. The following table gives the results after lying on the cooling floor:

Per cent. of San Francisco ore used.	Mesh of screen for ore.	Mesh of screen for salt.	Per cent. of salt.	Per cent. extraction by extra solution in assay office.
100	60	30	17	92·3
100	60	0	0	71·4
76	30	12	12	74·6
90	24	12	14	71·1
100	24	12	12	54·5

While using a 60-mesh screen the draught in the furnace was strong and the sulphur easily oxidized. The difficulty in using a 30 or 24-mesh screen was that the weight and bulk of the particles of such a heavily sulphureted ore and the rapidity of their falling in the shaft of the furnace destroyed the draught, making it downward instead of upward. The run was cut short on this account.

(2) *Furnace Roasting with Air Blast in the Furnace, but without a Preliminary Heap Roasting.*—In order to balance the effect of the heavy, coarse particles falling in the shaft, to restore the draught, and to furnish air for the oxidizing of the sulphur, a No. 4 Baker blower was connected with the furnace by a tuyere at the top of the return flue. This was inserted through the top of the return flue, in the direction of its length, and with its lower end about two feet below the opening from the shaft to the return flue. The actual extraction in the leaching department for this run, based on roasted-ore weights and values, was 67·9%, the apparent extraction being 73%. During the experiments of this section the roasting was conducted for five days without salt, and for three days without fuel, the only heat being furnished by the oxidation of the sulphur of the ore while falling in the shaft and return flue. Also for eleven days the roasting was conducted with open shaft hopper, allowing the ore to fall directly through and out of the furnace into the cooling-floor cars. With this method of roasting and with an ore containing only 17% sulphur, crushed through a 24-mesh screen and roasted with 11·5% salt added to the raw ore, the actual mill extraction based on raw-ore weights and values was 79·8, or if based on roasted-ore weights and values 95%.

A run with ore containing over 20% sulphur, crushed through a 40-mesh slot-punched screen, and with 11·4% salt added undried and uncrushed at the bottom of the furnace to the roasted ore, yielded 87·4% in actual mill extraction based on raw-ore weights and values. All ore treated in the experiments of this section was crushed by rolls. The results showed that for roasting, except after fine crushing, the sulphur contents of the ore should be reduced.

(3) *Furnace Roasting after a Preliminary Heap Roasting.*—With the object of reducing the sulphur contents of the ore, heap roasting was adopted, as suggested by Mr. Stetefeldt. The first experiments in this direction were made in a 7-ton kiln built of *adobes*, and afterward in heaps of 50 to 300 tons. The piles were built as follows; trenches about one foot in depth and width were dug about two feet apart. Similar trenches were made at right angles across these. All were covered with old grate bars or flat stones, laid an inch or two apart. The trenches under the grate bars or stones were then filled with kindlings and the ore piled on top to any convenient height, generally from 6 to 12 feet.

The noteworthy features about the heap roasting were; no silver was lost, the whole lot of heap-roasted ore containing a little more silver than the whole lot of raw ore; the amount of fuel required was about one-half cord of wood per 500 tons of ore; and the piles burned rapidly, a 300-ton heap requiring only four to five days. A disadvantage, however, of such rapid burning was that the interior of the pile sintered. This was remedied by covering the pile with fine material, causing the burning to proceed more slowly. All the field roasting was done at the mine, scarcely any extra handling of the ore being required.

The extra expense of heap roasting was probably less than 15 cents per ton. In reality there was no extra expense, as by heap roasting, costing 15 cents, the drying of the ore at the mill, which was otherwise necessary, and cost 25 to 30 cents per ton, was avoided. As to the mill methods employed on the heap-roasted ore, part was crushed by rolls through a 40-mesh slot-punched screen (corresponding to about 20-mesh with stamps) and part by stamps through a 6-mesh screen. The salt used in roasting during this section of experiments averaged 8·7%, of which 1% was added to the raw ore and the remainder thrown into the shaft and return flue of the furnace on top of the roasted ore. In the leaching department the average rate of leaching was 10 inches per hour on ore crushed by stamps as against 12 inches per hour on ore crushed by rolls. The total amount of water used in leaching was 64 cubic feet per ton. The sluicing-out of tailings required 16 cubic feet more. The average number of pounds of chemicals used per ton in leaching was: hyposulphite, 1·8; bluestone, 6·3; sodium carbonate, 6·3; caustic soda, 4·0; sulphur, 2.6. The strength of the stock solution was 1·5% hyposulphite, and of the extra solution, $\frac{7}{10}$% bluestone.

The average time of charging vats (50 tons) was eight hours, of first washing, 12 hours, leaching and second washing, 46 hours, sluicing-out tailings, 1½ hours, or a total of 67½ hours.

The mill extraction from ore crushed by stamps, and roasted with 6·7% salt, was about 3% higher than on ore crushed by rolls and roasted with 8% salt. During the experiments of this section the average loss of silver by dust from machinery and furnace and by volatilization in roasting was 3·6% of the raw-ore weights and values, that of the last run being 1·3%. The actual mill clean-up, based on raw-ore weights and values for all the experiments of this section, was 86·3%, that of the last run being 90·9%, or, if based on roasted-ore weights and values, 93·0%.

The following is a summary of the changes in mill methods and of the results obtained in the treatment of Sombrerete ore containing about 66% sulphides: All drying of the ore at the mill was discarded; the ore crushing was changed from 60-mesh to 6-mesh; the fineness of crushing of salt from 30-mesh to using it undried and uncrushed; the method of using it, from adding it to the raw ore to adding it to the roasted ore; the per cent. of salt was reduced to 6·5; the loss in silver by dust from machinery and furnace and volatilization in roasting was reduced to 1·3%; the results of leaching in the mill equaled and exceeded the results which could be obtained by assay-office leaching tests on the same roasted ore. The results attained on all heap-roasted ore averaged 86·3% actual extraction, based on raw-ore weights and values, or 90·9 on the last run, or 93%, based on roasted-ore weights and values, all of which were about such as would be obtained in the same running time and with the same amount of ore in any new mill. The results at the Sombrerete mill compared with those of the Marsac Mill (Daly Mining Company) were as follows:

	Silver. Ounces per ton.	Gold. Value per ton.	Per cent. silver extracted.	Per cent. gold extracted.	Cost of mining per ton.	Cost of milling per ton.
Sombrerete.	40·00	$2·25	83·0	50·0	$6·79	$6·18
Daly.....	43·40	1·35	89·2	41·5	5·50	6·40

CONTINUOUS UTILIZATION OF TIDAL POWER.

An ingenious scheme for the continuous utilization of the rise and fall of tides for power purposes was described by P. Decœur in a paper recently read before the British Institute of Civil Engineers, an abstract of which is given by the *Engineer*, as follows:

In connection with the training walls to be constructed in the estuary of the Seine, it is proposed, in place of reclaiming the space behind the walls, to construct large basins, by means of which the power available from the rise and fall of the tide could be utilized. No excavation would be necessary. The method proposed is to have two basins separated by a bank rising above high water, within which turbines would be placed. The upper basin would be in communication with the sea during the higher one-third of the tidal range, rising, and the lower basin during the lower one-third of the tidal range, falling. If H be the range in feet the level in the upper basin would never fall below $\frac{2}{3}H$ measured from low water, and the level in the lower basin would never rise above $\frac{1}{3}H$. The available head varies between 0·53 H and 0·80 H, the mean value being $\frac{2}{3}H$. If S square feet be the area of the lower basin, and the above conditions are fulfilled, a quantity $\frac{SH}{3}$ cubic feet of water is delivered through the turbines in the space of 9¼ hours. The mean flow is therefore $\frac{SH}{99{,}900}$ cubic feet per second, and, the mean fall being $\frac{2}{3}H$, the available gross horse power is about $\frac{S^1 H^2}{30}$, where S^1 is measured in acres. This might be increased by about one-third if a variation of level in the basins amounting to $\frac{1}{3}H$ were permitted. But to reach this end the number of turbines would have to be doubled, the mean head being reduced to $\frac{1}{3}H$, and it would be more difficult to transmit a constant power from the turbines. The turbine proposed is of an improved model designed to utilize a large flow with a moderate diameter. One has been designed to produce 300 horse power, with a minimum head of 5 feet 3 inches at a speed of 15 revolutions per minute, the vanes having 13 feet internal diameter. The speed would be maintained constant by regulating sluices.

It is proposed to establish power stations of this kind on both banks of the Seine near Honfleur and Havre respectively. On the left bank the surface available would be nearly 2,500 acres; and the tidal range varying between 10 feet and 26 feet, 3,000 horse power could be realized at neap tides and 9,000 horse power at springs. The line of the training walls on the right bank is not sufficiently known to enable the scheme to be worked out for that side. The cost of the special works necessary on the left bank, not including training walls, is estimated at £72,000, or £12 per mean horse power developed on the turbine shafts. It is estimated that the government would be well repaid if it charged customers £1 12s. per horse power, on turbine shaft, per annum. Steam power costs at Havre on the average for small factories about £24 per horse power per annum

LEADING COAL MEN.

C. J. Wittenberg.

When a man has succeeded, by his own efforts and ability alone, in winning a position of marked prominence in the business world before passing his twenty-sixth birthday, his career is certainly worthy of attention. Mr. C. J. Wittenberg, vice-president of the Cresson and Clearfield Coal and Coke Company, has achieved this position, although his entire business experience has been less than six years, and to-day ranks literally as one of "the leading coal men."

Mr. Wittenberg was born in Elmira, N. Y., in 1865. He received a school education, and continued his studies in this city and at Cornell University when he took a course in electrical engineering. He became active in the coal trade in 1887, at which time he became connected with the Cresson & Clearfield Coal and Coke Company. He spent some time at the mines for the purpose of acquiring a practical knowledge of the coal-mining industry, paying particular attention to the details of the selling department. In 1888 he was appointed general sales agent of the company, with an office in New York. So successfully did he administer the affairs of his office that in the following year he was made vice-president of the company. Being in charge of the New York office he transacts all the eastern business, and the success which his corporation has achieved, the rapidity with which new and responsible duties have been intrusted to his care, speak more plainly than words in praise of his integrity and executive ability. An idea of the magnitude of the business of which he is in charge may be formed from the fact that transactions representing more than half a million tons of coal passed through his office during the past year.

Although Mr. Wittenberg's business career has extended over so short a period, his clear head and sound judgment have been instrumental in forming for him business connections which many an older man might feel proud of winning. In addition to his position with the Cresson and Clearfield Coal and Coke Company, he is officially connected with the Cresson Railroad, the Altoona & Wapsononock Railroad Company, the Alleghany and Clearfield Coal Company, president of a water transportation company, and a director in several other large corporations. One of the most flattering testimonials which has been paid him was an invitation which he received recently to join the board of directors in one of the prominent national banks of New York.

C. J. WITTENBERG.

Notwithstanding his very active business career, Mr. Wittenberg does not close his eyes to the needs of his less fortunate fellow-men, and the attention which he gives to the welfare of his employés shows him to be a practical philanthropist. The model little mining town of Frugality, which is the home of some 2,000 people, is an eloquent monument to what he has done to improve the lot of its toiling inhabitants. In this work he has been associated with Judge John Dean, a sketch of whose life appeared in the ENGINEERING AND MINING JOURNAL, December 20th, 1890. Together they have built several hundred dwellings for the company's employés, endowed two churches, erected schools, a public hall, an opera house and a model hotel. The next boon which these gentlemen are to give to their little town is a workingmen's savings bank. These improvements have made Frugality a very different place from many Pennsylvania mining towns, and have conferred immense benefit upon its working population. The evidences of thrift, prosperity and contentment which manifest a healthy, moral atmosphere, permeate this law-abiding community, showing plainly the success which these employers have attained in their efforts to assist their employés.

As might be naturally supposed, there is nothing sluggish in Mr. Wittenberg's composition. He is thoroughly wide awake and energetic. As a business man he possesses a keen perception, a sound, quick judgment, and a knowledge of men and affairs, which is remarkable in one so young. His intimate business association with Judge Dean, that man of sterling qualities, has doubtless been an important factor in the formation of his character. An innate modesty renders him reticent on personal subjects. Socially he holds a firm place in the hearts of his friends; to know him is to like him. His wide circle of acquaintances and friends testify to his popularity, while his membership in several of the leading clubs and the social organizations of the city proves that he does not become so absorbed in business affairs as to forget the lighter side of life.

THE BASIC BESSEMER PROCESS APPLIED TO COPPER SMELTING.

In a paper read before the London section of the Society of Chemical Industry on January 5th, Mr. Percy C. Gilchrist stated that he had been conducting a series of experiments with the object of obtaining similar advantages in copper smelting to those which resulted from the replacement of the ordinary silicious linings of steel melting furnaces by a lining composed of basic material, and now well known as his basic steel process. The two processes are not, however, identical, as in ordinary copper smelting with acid-lined furnaces the loss is due to the formation of copper oxide and its removal in the slags rather than to the incomplete removal of arsenic and antimony from the metal. It was, therefore, rather in the direction of lessened oxidation, and consequently increased yield, that the author expected improved results by the use of basic linings and more calcareous slags in copper smelting.

Arsenical metallic bottoms, however, are advantageously converted into blister copper containing less than 1% of arsenic by the use of basic roaster furnaces. The removal of the arsenic is accompanied by a largely increased yield of "blister," and there is a further advantage, that the bottom of the furnace when basic-lined does not wear away with the same rapidity as when lined with sand. A very considerable gain in output is also obtained when white or "pimple" metal is treated in a basic roaster furnace, being in some cases as much as 34% in favor of the basi process. Analyses of various samples show no practical difference between the refined copper production from the basic blister and that produced from acid blister when an acid-lined refinery is used. When making ordinary tough cake, however, it is doubtful whether the extra cost of the initial basic lining and of the current repairs is compensated by the slight increase in the yield, but the saving in making "best selected" copper from ordinary arsenical blister is considerable. The basic refinery has hitherto been used chiefly for making best selected copper from B. S. precipitate only, but pure blister or blister containing 1% of arsenic also yields good results. The most important applications of the new process seem to be that of working down blister rather high in arsenic into B. S. ingots and the treatment of highly arsenical material tapped from the smelting furnaces.

The high price of copper renders the question of yield of greater importance than time and labor, and the loss attending a Bessemerizing process applied to copper smelting will probably be too high to make the method economical. Open-hearth steel is rapidly becoming as cheap as that made in a converter, and if this is the case with steel, an open-hearth basic process will, no doubt, soon become general for copper smelting.

Determination of the Specific Gravity of Gases.—F. G. C. Müller describes in *Zeit. f. physik. u. chem. Unterricht* his new method for determining the specific gravity of gases. The manometer tube used is 600 millimeters wide, slightly curved below, and fixed horizontally. As a manometric liquid the author employs colored ether. The atmospheric pressure acts upon one end of the liquid column, and at the other the pressure of the column of gas or steam to be measured, which is placed in a vertical glass tube 2 centimeters in width and 120 centimeters in length, open above and filled from below. If this tube is filled with air the liquid in the manometer stands at zero. For gases which are lighter than air, the pressure tube is inverted.

PRODUCTION OF PIG IRON IN THE UNITED STATES IN 1890.

The American Iron and Steel Association has received from the manufacturers complete statistics of the production of pig iron and Bessemer steel ingots in the United States in the last six months of the year; also complete statistics of the stocks of unsold pig iron in the hands of the manufacturers or their agents on the 31st of December, 1890. We make the following extracts from this valuable report:

The production of pig iron in the first half of 1890 was 4,560,513 gross tons, and in the second half of 1890 it was 4,642,190 gross tons—an increase of 81,677 tons in the second half.

The increased production in 1890 was well distributed throughout the leading pig-iron producing States, although the increase in Pennsylvania was exceptionally large, amounting to 763,927 net tons. The next largest increase was in Illinois, with 184,204 net tons; followed by Ohio, with 173,598 tons; Maryland, with 131,712 tons; Alabama, with 123,515 tons; Wisconsin, with 87,603 tons; Virginia, with 76,556 tons; New York, with 72,134 tons; New Jersey, with 52,095 tons; Michigan, with 44,105 tons; West Virginia, with 27,070 tons; Colorado, with 20,910 tons, and Missouri with 14,360 tons.

The production of pig iron in Alabama in 1890 shows a very much smaller increase, both absolutely and relatively, than in either of the two preceding years. Tennessee, Kentucky, Georgia, and North Carolina made only nominal progress in 1890, but Maryland, Virginia, and West Virginia contributed handsomely to a grand total of 1,953,459 nets tons for the Southern States in 1890, against 1,566,702 net tons in 1889—a gain of 386,757 tons.

In addition to the unsold stocks at the close of 1890 given in the tables there were at that date in storage warrant yards 59,289 net tons, making a total of 741,281 net tons of pig iron then on the market.

PRODUCTION OF PIG IRON IN 1887, 1888, 1889 AND 1890.

STATES.	Tons of 2,000 pounds.			
	1887.	1888.	1889.	1890.
Maine	4,397	5,574	5,200	1,200
Massachusetts	11,114	13,248	7,751	5,531
Connecticut	21,741	21,644	24,143	22,552
New York	296,572	257,180	297,247	369,381
New Jersey	172,554	101,882	125,693	177,788
Pennsylvania	3,684,618	3,589,186	4,181,242	4,945,169
Maryland	37,427	17,606	33,847	165,559
Virginia	175,715	197,396	251,356	327,912
North Carolina	3,640	2,400	2,898	3,181
Georgia	40,947	39,397	27,559	32,687
Alabama	292,762	449 492	791,425	914,940
Texas	4,383	6,587	4,544	10,865
West Virginia	82,311	95,259	117,900	144,970
Kentucky	41,907	56,790	42,518	53,604
Tennessee	250,344	267,931	294,655	299 741
Ohio	975,539	1,103,818	1,215,572	1,389,170
Indiana	13,211	15,260	9,839	16,398
Illinois	565,453	579,307	601,035	785,239
Michigan	213,543	213,251	214,356	258,461
Wisconsin	133,508	116,057	158,634	245,237
Missouri	138,643	91,783	85,190	100,550
Colorado	25,291	20,877	2,678	23,588
Oregon		2,509	9,426	12,305
Washington	1,586	4,093	10,371	
Total	7,187,206	7,268,507	8,516,079	10,307,028

TOTAL STOCKS OF UNSOLD PIG IRON.

STATES.	Tons of 2,000 pounds.			
	June 30, 1889.	December 31, 1889.	June 30, 1890.	December 31, 1890.
New England	19,347	19,897	15,344	11,572
New York	58,169	42,607	38,323	64,381
New Jersey	27,552	5,800	500	25,068
Pennsylvania	195,931	67,005	135,303	204,535
Maryland	2,218	1,372	1,880	1,637
Va., N. C., Ga., and Tex.	30,662	8,130	19,149	28,707
Alabama	36,449	39,916	58,717	69,957
West Virginia	3,217		1,080	11,414
Kentucky	8,050	5,382	8,176	9,413
Tennessee	17,565	7,982	11,089	28,142
Ohio	70,909	27,579	46,192	116,608
Michigan and Indiana	37,257	25,102	18,339	56,452
Illinois				19,504
Wisconsin	17,365	9,498	14,424	
Missouri and Colorado	33,438	8,981	13,424	29,434
Pacific States	5,157	8,220	7,304	5,168
Total	563,286	277,401	389,244	681,992
Bituminous	247,564	86,772	196,595	341,303
Anthracite	165,334	77,502	83,160	164,301
Charcoal	150,388	113,127	109,489	176,388

PRODUCTION OF BESSEMER PIG IRON IN 1890.

New York	119,007	80,117	199,124
New Jersey	31,421	41,055	72,476
Pennsylvania	1,303,734	1,334,130	2,637,864
Maryland	63,276	81,009	144,285
North Carolina	577	1.780	2,357
West Virginia	57,433	80,875	138,308
Ohio	270,914	280,193	551,107
Illinois	318,795	385,532	704,327
Michigan		1,285	1,285
Missouri	39,551	29,913	69,454
Wisconsin	27,892	13,572	41,464
Colorado	8,945	12,428	21,373
Total	2,241,545	2,341,879	4,583,424

TOTAL PRODUCTION OF PIG IRON.

STATES.	Blast furnaces.				Production. Tons of 2,000 pounds. (Includes spiegeleisen.)		
	In blast June 30, '90	Dec. 31, 1890. In.	Out.	Total	First half of 1890.	Second half of 1890.	Total for 1890.
Maine			1	1	1,200		1,200
Massachusetts	1	2	2	4	3,281	2,250	5,531
Connecticut	4	6	3	9	9,665	12,887	22,552
New York	15	12	25	37	206,406	162,975	369,381
New Jersey	9	9	7	16	87 096	90,692	177,788
Pennsylvania	151	139	83	222	2,495,827	2,449,342	4,945,169
Maryland	4	4	7	11	72,632	92.927	165,559
Virginia	14	14	18	32	167,052	160,860	327,912
N. Carolina	1	1		1	1,401	1,780	3,181
Georgia	4	1	4	5	10,599	22,088	32,687
Alabama	32	21	31	52	463,451	451.489	914,940
Texas	1	1	2	3	5,817	5,048	10,865
West Virginia	3	3	2	5	63,639	81,331	144,970
Kentucky	4	3	3	6	25,546	28,058	53,604
Tennessee	12	14	6	20	143,493	156,248	299.741
Ohio	43	42	29	71	682,681	706,489	1,389,170
Indiana	1	2		2	9,437	6,961	16.398
Illinois	12	11	4	15	354,635	430,604	785,239
Michigan	16	14	13	27	110,915	147,546	258,461
Wisconsin	6	8	2	10	122,584	123,653	246,237
Minnesota			1	1			
Missouri	4	2	6	8	55,736	44,814	100,550
Colorado	1	1	1	2	10,271	13,317	23,588
Oregon	1	1		1	4,411	7,894	12,305
Washington			1	1			
Total, 1890	339	311	251	562	5,107,775	5,199,253	10,307,028
Anthracite	111	97	69	166	1,227,195	1,221,586	2,448,781
Charcoal	63	64	76	140	314,427	389,095	703,522
Bituminous	165	150	106	256	3,566,153	3,588,572	7,154,725

SOLDERING ALUMINUM.

The Aluminum Company of Neuhausen, Switzerland, says *Neueste Erfindungen und Erfahrungen*, is now manufacturing a specially prepared aluminum, in sheets, which can readily be soldered with an ordinary soldering iron and tin solder. The line of juncture is prepared by applying a mixture of resin, tallow, and neutral chloride of zinc. Scraping or otherwise cleaning the place to be soldered is to be avoided, although alcohol or turpentine may be used when cleaning is absolutely necessary.

Sheet aluminum, it is said, may readily be soldered if previously given a light plating with copper. Aluminum thus soldered should not be heated suddenly, however, as much of the copper will strip off and thereby render the joint useless. Nevertheless in many cases the process is very satisfactory, and particularly so when the copper-plated edges are allowed to lap over each other.

Aluminum bronze containing as much as 5% of aluminum may be readily soft-soldered with ordinary tin solder. Increasing percentages of aluminum render the soldering more and more difficult, until with 10% of aluminum it becomes impossible. The method above referred to, of slightly plating with copper, will be found a help in such cases. When no tank is convenient for dipping the edges into the plating solution, very fair results may be obtained by using a number of pieces of blotting paper well soaked with solution of cupric sulphate. The paper is placed in contact with the article to be plated and with a piece of copper. The battery is then attached by wires with the positive pole to the copper and the negative pole to the casting or other object to be plated. A very short time is sufficient to give a plating heavy enough for soldering purposes. If for any reason a battery is not obtainable for plating, the bronze may be prepared with a mixture of resin, tallow, neutral chloride of zinc and corrosive sublimate.

Hard-soldering offers no difficulties. A good solder for this purpose is made by smelting together 52 parts copper, 46 parts zinc and 2 parts tin. Borax is used as the flux, and the process is the usual one. Tests of joints made with this solder were made at Neuhausen, and showed that aluminum-bronze plates butted together gave a resistance to pulling strain of 26 to 28 kilograms per square millimeter; lapped joints (5 millimeters lap) required 39 kilograms per square millimeter to part them.

Tubes made from sheets with this solder can be drawn down on a mandrel.

Aluminum-bronze castings may be united by sweating or burning. The parts to be joined are placed in a sand mould, and an excess of hot metal flowed over the joint. When carefully done the joint cannot be seen, and shows as great strength as the body of the casting. Thin cylinders may be made in this way by bending sheets and sweating their edges together.

Extraction of Gold and Silver.—J. Buchanan, Glasgow, has invented the following process of precipitating gold and silver from the solutions in which they are dissolved in the process of extracting the same by chlorine, bromine, or iodine under pressure or otherwise. This is effected by allowing the liquid so obtained to percolate through iron or steel borings at the ordinary or at an elevated temperature. The gold and silver are claimed to be thus completely deposited on the iron, and may afterwards be removed from the same by riddling and washing, or otherwise. In place of iron, copper, brass, zinc, or other metal or alloy capable of precipitating gold and silver during the percolation of solutions containing same dissolved by chlorine, bromine, or iodine, or a combination of one or more of such metals may be used together with charcoal prepared by riddling or otherwise.

Marbeau's Nickelo Spiegel.—For preparing nickel steels or ferro-nickel, Marbeau has secured the patent rights of an alloy containing nickel, iron and manganese of indefinite composition, but called by the patentee "nickelo-spiegel." He forms it by reducing the ores of these three metals at the same time in one operation, and gives the following proportions as affording good results:

Nickel ore containing 10% nickel	2 tons
Manganese ore containing 10% manganese and 40% iron	1 ton.
Iron ore containing 50% iron	12 cwt.

GRAVITY PLANE AT MOULTON HILL MINE, QUEBEC.

Written for the Engineering and Mining Journal by F. J. Falding.

The cost of getting ore from the mine or dressing floor to the railroad cars often bears an entirely undue proportion of mileage cost, as compared with its shipment to market. Any new system of carriage from mine to railroad or vessel, or favorable modification of older systems, should naturally, therefore, be interesting to mine owners.

The causes of this increased expense are plain enough, and are owing, first, to the necessity in most cases of a separate power for the transportation of the ore over a comparatively short distance; secondly, from the extreme cost of construction of means of carriage over this short distance in most cases, owing to the usually more or less inaccessible position of mines; and thirdly, to the comparatively contracted tonnage to which the cost of transportation has to be charged. Of these three causes of expense, the third one would seem to be beyond control, as the output of every mine is governed by causes inherent to itself or the exigencies of its owners. Some mines are incapable of producing more than a certain output; at other mines there is no market to be found for more than a certain output, etc. The first and second items of expense, however, viz., the cost of power and cost of means of transport, whether surface or aerial, whether capital charge or maintenance, are largely under the control of careful management, and may be greatly reduced by competent engineering. The problem at every mine varies more or less; but the following description of a tramway just completed under my charge at the Moulton Hill Mine, near Sherbrooke, Province of Quebec, contains some combinations, which, to the best of my knowledge, are novel, although there is nothing new in the principles involved. This system could be applied, either by modification or amplification, to meet the wants of many mining properties situated within a mile and a half or two miles from a shipping point.

After complete surveys had been made of all possible routes from the mine to the railroad, the profile of the most available route was found to be as in cut No. 1. It will be seen that from a point *A*, at which the dressed ore ready for shipment could be automatically loaded into cars from a bin, to a point *B*, the line crossed a depression, varying from nothing at *A* to about twenty-five feet half way between *A* and *B*, *B* being about fifteen feet below *A*. From *B* to *C*, which is a point about twenty feet above the level of the railroad shipping point (so as to allow for bin room and loading the railroad cars automatically), the contour gave a fairly even slope, averaging about ten per cent.

This was amply sufficient grade to justify the consideration of the adoption of a gravity system, though not sufficient to justify putting such a system into operation without careful calculation and construction.

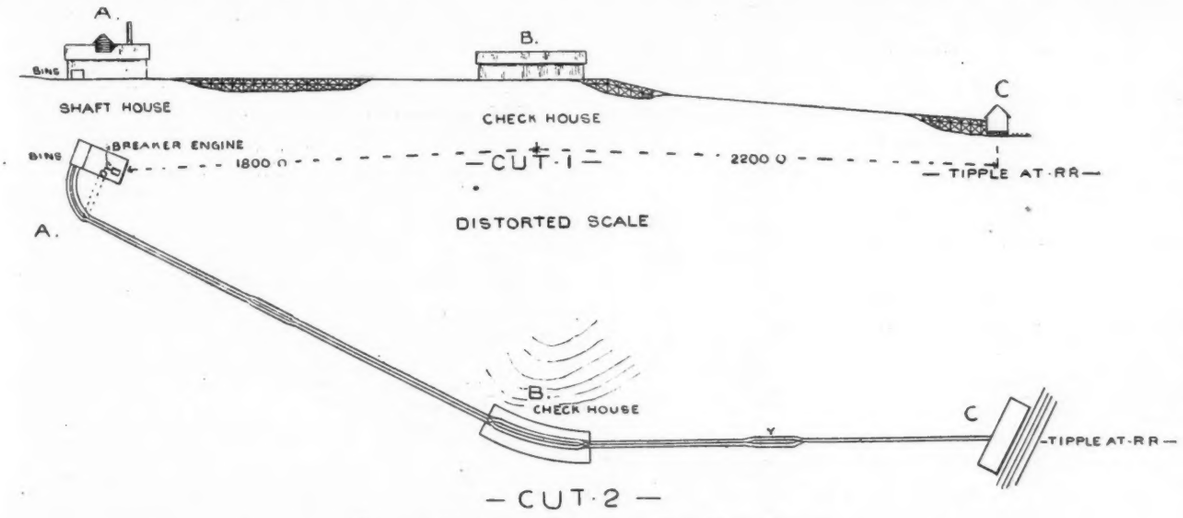
The first obstacle in the way of economy in transporting the ore to shipping points could, therefore, be largely overcome if this natural fall from the mine level at *A* to *C* could be utilized; and, if it could be utilized and at the same time an economical roadbed (whether surface or aerial) could be constructed, then the two principal items of expense would have been satisfactorily dealt with.

In nearly all gravity planes, the brake on the drums around which the rope is wrapped occupies a most conspicuous position, and it seemed that if, instead of exerting so much ingenuity for the purpose of destroying a surplus of power, that power could be successfully harnessed and made to serve the useful purpose of bringing the ore from the mine to the head of the plane, so feeding itself, the gain in economy would be considerable, and the result would be that the entire profile of the line, level from *A* to *B* and inclined from *B* to *C*, would become part of one self-acting system. On reference to Fig. 2 (plan) it will be seen that the course of the line from *B* to *C* changes, the two sections of the line enclosing an angle of 153°. This, of course, added another difficulty. The section *A* to *B* is 1,800 feet, and *B* to *C*, 2,200 feet. It was therefore palpable that if the surplus power obtained from *B* to *C* were not sufficient to draw the load from *A* to *B* directly, it would be still possible that the surplus power might, by proper differential arrangements at *B*, be made to draw the load more slowly over the shorter distance, the load still arriving from *A* at *B* at the same time that the load was received at *C* from *B*. After the necessary calculations, however, had been made, it was seen that by a proper construction of the cars and properly proportioning the load and the weight of the rope, etc., there would be a sufficient surplus of power left to carry, under ordinary circumstances, a load from *A* to *B* on a dead level.

At this point, a further question was considered, and that was as to whether it would not be possible, by simply hitching the rope to the spare power of an engine otherwise employed, to draw up the inclined plane a load of coal or other supplies at a minimum expense, only taking a minimum of power from the engine, and utilizing the available force of gravity to its last fraction. With a steeper incline than 10%, which alone was available in this case, of course, it would be quite unnecessary to connect the gravity system with any other power.

These objects have been attained as follows: A cheap but substantial trestle was constructed as the profile required, from *A* to *B* giving a slight grade of three-fourths of one per cent. in favor of the load. From *B* to *C* the road was graded by means of trestle, cut and fill, so as to make the grade 14% for 200 feet beyond *B* and 9·2% thence to *C*. As it was essential that the roadbed should be stiff and friction reduced to a minimum, a 36-lb. steel rail was used, three rails being laid from *A* to *B*, with a parting half way, and three rails from *B* to a point half way between *B* and *C* and two rails only thence to *C*, switches at the partings being automatic. At *B*, the check house, a shed was erected, covering switches where the cars are changed, which operation is performed by one man; the gauge in every case being three feet, the cars weighing about 1,200 pounds and carrying about 7,000 pounds, and the rope, best crucible cast steel, five-eighths inch diameter, all rollers placed 15 feet apart. The rope is led from point *B* around angle rollers toward *A*, where it again passes around an angle sheave to a point *D*, where the engine is situated which drives the rock breaker. Coupled to the main shaft of this engine is a short length of smaller shafting, carrying two friction bevel pinions, operating a bevel wheel in such a way that with the engine shaft revolving in the same direction, by engaging one or the other of these friction pinions, the horizontal bevel wheel can be driven in either direction. This bevel wheel is keyed to a vertical spindle which carries a modified Huson grip of peculiar construction, underneath which is attached a brake drum and strap. The rope is passed around this grip and then led back through *B* to *C* by means of angle sheaves. The operation is extremely simple. Two loaded cars are attached to the end of the rope at *B*, two loaded cars are attached by an automatic grip to the rope at *A*, two empty cars are attached to the end of the rope at *C*, and two empty cars are attached to the same half of the rope at *B*. The loaded cars at *A* are then pushed over the edge of the incline, when the whole system at once commences to work. When the loaded cars attached at *A* have reached *B*, the automatic grip disengages, and these cars run on to the switches, which have been opened so as to place them in their proper position for continuing the journey to *C*, and at the same time the two empty cars which left *B* having arrived at *A*, are automatically disengaged and are ready for re-loading. In the meantime the cars attached to the ends of the rope have, in the case of the loaded ones, reached *C*, and the unloaded ones have reached *B*. The rope is then in the same relative position, and is ready to go through the same course again, but in an opposite direction. Arrangements are so made that the attendance of three men is sufficient to load and unload the cars and to operate the line; one man at *A* loading, one man at *B* transferring, and one man at *C* unloading. In case for any reason, such as hauling supplies to the mine, it should be necessary to attach the engine to the system, the engineer driving the breaker engine at *A* has simply, on signal, to throw one of two levers into position or to apply or throw off the brake.

This system is now in operation. The round trip occupies about six minutes, and carries two full cars, containing 14,000 pounds of ore, from the check house *B* to the railroad *C* and two cars, containing 14,000 pounds of ore, from the mine *A* to the check house *B*; also two empty from the railroad bin *C* to the check house *B*, and two empty from the check house *B* to the mine *A*. In full operation and with a sufficient number of cars, and allowing for all detentions, it should be possible to make a trip every twelve minutes at least. This would give the road a capacity of $14{,}000 \times 5 = 70{,}000$ pounds of ore per hour, or 700,000 pounds per day of 10 hours = 350 short tons. Such a road under more favorable



GRAVITY TRAMWAY AT MOULTON HILL MINE, QUEBEC.

circumstances could, of course, be constructed to handle very much larger quantities. With careful construction, the wear and tear and consequent cost of maintenance will be very inconsiderable, and with proper terminal facilities, no more than three men are required to operate it. The test of such a road at the Moulton Hill Mine has been about as severe as could be imposed. The road was started in a snowstorm, and has been run through a series of snow storms and constant freezing weather ranging to 15° below zero; yet beyond slight adjustments, which are always necessary in a construction of this kind, has required no structural alteration of any nature whatever. The signaling apparatus is supplied by the Bell Telephone Co., and includes both gong signal and telephone. The methods of operating are similar in every respect to those used on well constructed gravity planes. The iron work was constructed and placed in position, and the grip wheel and engine connection were devised by Mr. F. H. McDowell, and his assistant, Mr. S. A. Cooney. Mr. Francis S. Coke, C. E., the writer's assistant, was in general charge of construction.

OFFICIAL REPORTS.

Granite Mountain Mining Company.

The following is an abstract of the official report of the Directors of the Granite Mountain Mining Company for the fiscal year ending July 31, 1890.

From the date when operations were first commenced in the property (October 8, 1880) the total gross expenditures of every kind, except dividends, has been $5,542,488 94, and the total gross receipts, $14,828,456.65. Including dividend No. 70, paid October 10, 1890, the total amount paid the shareholders has been $9,800,000. During the past year the receipts exceeded those of the preceding by $540,300.09, and the disbursements, $632,450.88. The gold product of the mine increased 138%, and the silver product, in ounces, 16%. The inventory of the company's property showed an increase of $35,418.65. A ditch conveying an ample supply of water has been completed to the mills at Granite during the year, furnishing an additional safeguard in case of fire. The report of the treasurer shows the financial condition of the company as follows:

Balance cash on hand July 31, 1889			$129,906.92
Receipts.			
Proceeds 2,482 bars bullion, containing 3,743,168·27 ounces silver and 8,439·995 ounces gold		$3,804,738.46	
Less express charges	$54,644.02		
Less refining charges	43,316.78		
Less commission	3,890.11	101,850.91	
		$3,702,888.55	
Net proceeds 43·182 tons smelting ore containing 31,336 73 ounces silver and 17·601 ounces gold		22,655,94	
Net proceeds 10·277 tons furnace slag containing 12,367·89 ounces silver and 10 919 ounces gold		12,261·01	
Amount refunded on account of litigation by parties in interest		6,096.52	3,743,902.02
			$3,873,808.94
Disbursements.			
Mining expenses, freights, etc		$1,172,433.05	
Supply bills, home department purchases		162,170.44	
Insurance		9,885.85	
Attorney's fees		2,290.75	
Home department, salaries, rent, etc		25,820.41	
Dividends Nos. 56-67, inclusive		2,500,000.00	3,872,600.50
Balance July 31, 1890			$1,208.44

Mr. Thomas Weir, superintendent of the mine, stated in his report that the following development work had been done during the year. Levels and drifts, 4,399 feet; cross-cuts, 1,829 feet; winzes and raises, 234 feet; Ruby shaft, 204 feet. The total depth of the Ruby shaft, July 31st, was 1,180 feet. For some distance the vein had been broken, but at 1,080 feet it struck a new body of quartz assaying 90 ounces. The new and rich chute of ore which was struck by the 8th level east in 1889 was found richer and extended still further to the east in the 9th level. In other portions of the mine new ore bodies were opened. Great importance is attached to the fact that the vein was found strong, rich and well oxidized in the 13th level. The amount of ore stoped during the year and delivered to mills was 63,528 tons; shipped to smelter, 29 tons: stored, 6,881 tons; total, 70,440 tons. The average cost of mining ore, including tramming to mills A and B, and loading tramway to C was $5.84 per ton; levels, including timbering, $12.51 per linear foot; c osscuts, $14.08; winzes and raises, $23.80; sinking Ruby shaft, $60.45. The expense of exploration work increased somewhat owing to greater depth and necessity for more timber than usual, The three mills ran continuously during the year. The amount of ore crushed was 63,529 tons, wet, or 60,212 tons, dry; amount of salt used, 9,379 tons; average assay of ore, 70·94 ounces silver per ton; average percentage of saving, 92·17; average cost of milling, $10.22 per ton, dry. The salt and ore were mixed before crushing throughout the year. The cost of milling in C was only $9.36 per ton, including the cost of transporting the ore over the tramway. This amounted to 22 cents per ton. The average cost of transporting ore, salt, and other freight over the tramway was 38½ cents per ton. The detailed average cost of milling per ton of ore was as follows:

Labor:		*Supplies:*	
Superintendence	$0·284	Fuel	$1 639
Engineers	·159	Castings	·579
Firemen	·099	Salt	2 550
Crushermen	·122	Quicksilver	·970
Roastermen	·319	Bluestone	·144
Dryermen	·160	Lye	·029
Battery men and helpers	·453	Other chemicals	038
Cooling room	·250	Belting	·022
Pan men and helpers	·418	Lubricating	·066
Retortmen	·046	Illuminants	·031
Assaying	·095	Sundry supplies	·430
Watchmen	·055		
Millwrights	·113	Total	6·498
Repairing	·043	*Miscellaneous:*	
Sundry labor	·715	Tramming	·120
		Water	·096
Total	3·339	Blacksmithing	·129
		Total	·345

Eureka Consolidated Mining Company.

In the twenty-first annual report of the directors of this company for the fiscal year ending September 30th, 1890, it is stated that the output of the mine has been greater than for some years past. The furnaces and refinery have been doing good work and improvements have been made, enabling the company to handle ores to greater advantage. Three dividends, amounting to $37,500, were paid during the year. None of the suits pending against the company at the time of the last annual report has been decided. The claim against the Richmond Company has been satisfactorily adjusted, but the management of the latter company has not yet expressed willingness to join in the work of unwatering the two mines. Efforts are being made to procure the dismissal of the government timber suits against the Eureka Company, with prospects of success.

The amount of ore mined during the year was about 5,000 tons; drifts driven, 1,339 feet; winzes, 164 feet; raises, 312 feet. There were reduced in the furnaces during the year 4,744 tons of the company's ore 2,974 tons of custom ore, and 9,159 tons of matte, flue dust and speiss; total, 16,877 tons.

The report of the secretary showed the following financial condition, September 30th, 1890:

RECEIPTS.	
Bullion, 126 bars, 173,551 ounces	$318,733.82
Sales of lead, 785 1888/2000 tons	71,200 97
" mining supplies	54.50
" ore	1,021.24
Ore extracted	250.00
Total	$391,260.53
Balances, cash, drafts outstanding, etc	15,760.72
Total	$407,021.25
EXPENDITURES.	
Ores	$107,653.47
Mining expenses	34,733.89
Refinery account	18,737.74
Smelting account	105,427.85
General expense account, Eureka and San Francisco	20,653.28
All other expenses of handling bullion, freights, express, assaying, legal interest, etc	26,954.85
Construction and repairs	15,111.05
Dividends, Nos. 86, 87, 88	37,500.00
Total	$366,771.13
Balances, cash, drafts, etc	40,254.12
Total	$407,021.25
Total cash assets	115,754.94
Total liabilities	15,753.08
Balance of assets	$100 001.86

The directors recommend that dividends be postponed, and the profit of the mine added to the present net resources for the purpose of unwatering and working the lower levels.

SETTING OF PORTLAND CEMENT.

In an article on the hardening or setting of Portland-cement mortars the *Chemiker-Zeitung* directs attention to some recent experiments made by Herr Schiffner.

These tend to show that setting is retarded by some of the chemical and physical properties of the sand with which the cement is mixed, and also by the influence on the fresh mortar of acid liquids, vegetable oils, organic matter, sulphates of soda and potassium and soluble salts contained in bricks and earth. Too much water as well as too small a quantity in mixing the mortar likewise prevents proper hardening. Portland-cement mortar takes into chemical combination a definite quantity of water, and the highest degree of hardness is attained when this chemical absorption is complete. The formation of hydrosilicates due to this absorption is a gradual process. In a pure cement mortar the percentages of chemically combined water are:

	Per cent.		Per cent.
After mixing	0·99	After 14 days	7·96
" ½ hours	1·41	" 18 "	8·45
" 20 "	2·29	" 28 "	10·52
" 3 days	5·62	" 56 "	11·60
" 7 "	7·58	" 80 "	11·58

The discrepancy in the last two sets of figures is ascribed to inaccuracy in analysis, since the mortar does not lose any of its chemically combined water except through calcining.

Schiffner's experiments further showed that cement mortar, kept moist for 24 hours after mixing, and then placed under water, improves in hardness with the duration of its submersion. In the trials under consideration the longest period of submersion was 27 days. If, after mixing, the mortar is not kept moist, it becomes brittle and crumbles. In the cement briquettes kept under water for 27 days, Schiffner found from 10 to 11% water and from 1 to 1½% carbonic acid; in the briquettes kept under water for three days there was found from 6 to 7% water and from 1½ to 2½% carbonic acid. In dry briquettes the combined water amounted to only 4%, while the carbonic acid figured up to from 6 to 7%. It is concluded, therefore, that to secure the best results in using cement mortar it must not be given opportunity to become dry during the first few days after mixing.

The Columbia River Bridge.—The steel bridge across the Columbia River, at Vancouver, will, according to various contemporaries, be 6,000 feet from the Washington to the Oregon shore. It will be erected upon pneumatic piers and double tracked, with a roadway on top for teams. The pivoted, or draw pier, will support a draw which will give an opening of 200 feet space on either side for vessels to pass, and the span immediately south of the draw span will be 375 feet. The whole structure is to be of steel, built 10 feet above high water and 40 feet above low water. On account of the sandy formation it will be necessary to go down 80 feet below low water to get a firm foundation. There it rests on a foundation of coarse gravel similar to that upon which the great bridges across the Missouri River are built. This structure will cost over $1,000,000, and will be finished before Jan. 1, 1892. The company has now between Vancouver and Kalama over 2,000 men and 1,500 teams at work.

A MECHANICAL RETORT WITH CONTINUOUS FEED AND DISCHARGE.*

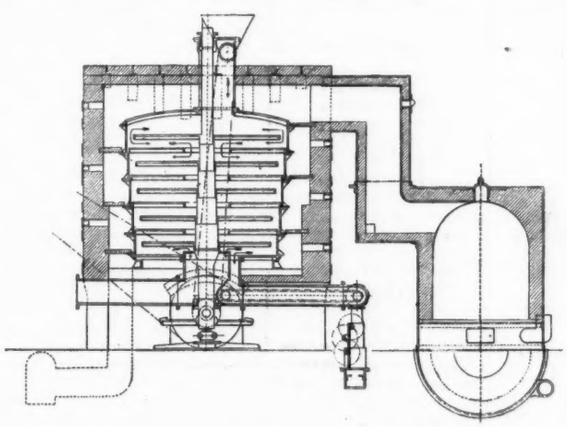
By R. Haig.

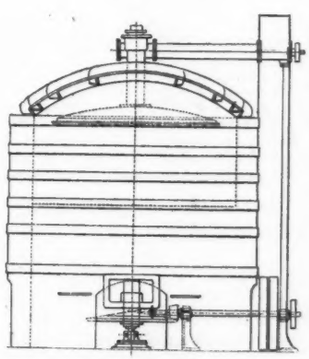
This retort, the patent of which belongs to the Mechanical Retorts Company, Limited, of Paisley, possesses apart from its mechanical principle, a feature interesting from a scientific point of view. This is the manner in which it utilizes the heat supplied.

A retort, in the ordinary conception of the term, is a vessel usually much longer than broad, and which may have its length disposed in a vertical, inclined, or horizontal direction. A furnace heats the outside, and the charge more or less completely occupies the inside. Heat passes by conduction through the shell of the retort to the contents, and upon the texture of these, as well as on the temperature of the fire, depends in a great measure the rapidity with which the charge is worked off.

The substances distilled are of low conductivity, and if they are charged into the retort in a state of fine division, or if they crumble during the distillation, the heat takes much longer to penetrate to the center of the charge than when, owing to the state of coarser division of the material, there is more interstitial space. This is owing to the fact that in the latter case the gases evolved from that portion of the charge adjacent to the hot shell are free to travel throughout the rest of the mass, and by convection distribute the heat they have received. The quantity of heat transmitted by radiation must be very small, and I know of no retort constructed specially to admit of an increase in this quantity. Inventors have centered their efforts on the production of a retort with such a cross section that no part of the charge shall be remote from the shell, and with as large a volume of gas—whether liberated from the material or introduced from outside—passing through the charge as could be conveniently dealt with.

In this retort the order of importance of the three ways by which heat may be transmitted is reversed. The charge is kept as free as possible from contact with the shell and is spread out to receive the heat radiated upon it from every side. The gases liberated are forced to travel in a certain direction which keeps them also as much as possible from contact with the shell, while at the same time they are made to traverse the interstices of the material, so that if hotter they impart heat to it, if colder they receive heat from it, and thus help by convection to equalize the temperature throughout, while the continuous renewal of the atmosphere in contact with any given particle of the substance undergoing decomposition greatly assists the removal of the products of heavier density and materially contributes to the realization of a genuine low-temperature process. The products are generated at the upper surface of the charge; by this surface they also escape, and are in no danger of having to penetrate a mass of material much hotter than themselves, as would be the case with gases generated in the middle of a charge heated by conduction from all round. It is only during about one-tenth of the period of distillation that the charge is in contact with a part of the shell directly heated by the furnace gases, and those furnace gases are at this point on their way to the chimney, and being almost spent can impart but little heat, while the charge having finished nine-tenths of its course through the higher or radiation-heating part of the retort is almost completely decomposed and in the condition least suitable for absorbing conduction heat.





The retort, as illustrated, consists of a vertical cylinder, with a diameter of eight feet at the bottom, which is increased by three inches at regular intervals till it is nine feet wide at the top and seven feet six inches high. Both top and bottom are closed by disk, each having a large hole at the center. Projecting upward from the top disk and downward from the bottom disk are sleeves which pass through the flues and brickwork to the open air, and which are fitted at their extreme ends with stuffing glands, in which the center shaft, driven from below by gearing, revolves. The sleeves are much wider than is necessary for the passage of this shaft. It is through the upper one that the substance to be distilled is charged, the products being removed by the lower one. The center shaft, like the shell, is also stepped, but instead of increasing toward the upper end it diminishes in diameter. The steps or shoulders are arranged at different levels from those on the shell, so that the disks which rest on them are exactly midway between those which rest on the shell. The disks rest alternately on the shaft and on the shell; those on the shaft revolve with it, those on the shell are stationary. The disks on the shaft do not quite reach to the shell, but are smaller in diameter by about a foot; the disks on the shell have an opening in their centers leaving an annular space round the shaft. From snugs cast on the under side of each plate are hung scrapers or deflectors which act like ploughs. Those, hung from a fixed disk, working on a revolving disk face toward the shell. Those, hung from a revolving disk, working on a fixed disk face toward the shaft. All are arranged to deflect the material on the respective disks outward from the shaft and inward from the shell. The material is put into the hopper on top either from hutches on an overhead railway or by means of a bucket elevator from the ground, and is thence forced by a screw to the branch on the upper sleeve; here it falls down alongside the shaft on to a moving plate near its center. As this plate moves slowly round the material forms a ring upon it. This ring is interrupted by a deflector hung from the top cover which pushes the material aside as fast as it comes round, and makes a larger ring while another small ring is being laid down. The large ring is again expanded into one still larger by another deflector, and so on till the outermost deflector pushes it over the edge of the disk on to the fixed disk below. As this deflector is itself fixed, the material falls on to the fixed disk at a fixed spot, and if left alone would pile up there, but certain deflectors hung from the edge of the moving disk, and which do not quite reach down to the fixed disk, are continually knocking the top off this heap and extending the material in a ribbon close to the shell. Here rings continue to be formed as before, but each succeeding one is lessened in diameter by a deflector hung from a moving disk, till all the material is pushed over the edge of the opening in the middle of the fixed disk. Here it arrives on the center of a moving plate, as at the first, and the cycle of movements outward and inward is repeated with each pair of disks till the material arrives at the bottom of the retort. It then falls down a chute in the bottom sleeve to the chain conveyor, and is carried out over the large bevel wheel to the double valve apparatus by which it is discharged into a wagon or otherwise removed.

By the arrangement of deflectors described the whole charge is not kept in continual motion, but only a little of it is being moved at any one time. Less power is therefore necessary for driving, and the deflectors move out of the way and leave the newly turned up substance fully exposed. The vapors travel in the same direction as the material and pass to the condenser by the larger opening in the bottom sleeve. The heat, which may be supplied by a gas producer or furnace, according as one or other is suitable for burning the coal of the district, is first applied to the top of the retort, which is covered by an arch of special construction, and from thence passes by a zigzag course on both sides of the retort to the bottom, below which the flue gases escape to the chimney. The cold material is introduced where the fire is hottest, and when the material begins to decompose, the flue temperature is moderated, but always remains hotter than the material, and imparts heat to it. This might not at first sight appear a good arrangement for ensuring economy in coal consumption, for the flue gases, being above the decomposing temperature of the charge, convey a lot of heat to the chimney which might be used up in warming a fresh quantity of material to the distilling point; but with the travel of the generated gases arranged as described, the temperature of volatilization of the heavier products is lowered undoubtedly, and it is possible that that of decomposition may, by the favoring conditions, be so as well; so that, though the hottest fire were applied below the retort, and the flue gases more thoroughly cooled by passing over the cold material above, it is doubtful if any economy would be gained, and it is certain that the equality of temperature, which is valuable, would be lost. The number of disks may be varied to suit the nature of the substance to be distilled, but I think need not exceed 12.

The retort at present in use at the Paisley works, Scotland, has only eight plates, and on a consumption of less than 2¾ cwt. of coal per ton of wood puts through an average quantity of 12 tons per day of 24 hours. The wood is principally birch in the form of shavings from the bobbin makers. The retort represented was sent abroad to distil shale, broken to the usual size for road metal; it has 10 plates, and also puts through 12 tons per day, but the coal used, which was of very poor quality, amounted to about 4 cwt. on the ton of shale; with Scotch coal this figure would be much lower.

The shell of the retort is made of cast iron one inch thick, and the disks, which are strengthened by ribs cast on their underside, have a thickness of ¾ inch; the total weight of an eight-plate machine is about 20 tons, and the machine work necessary is trifling. The brickwork is simple; the vault on the top is made so as to throw no strain on the side walls. Fireclay blocks with a check at each end are built into a "tee" iron curved to the circle of the outside of the vault and turned in at the ends, so that when the whole is lifted by a muzzle bolted to the web of the "tee" iron the bricks retain their position. Eight or ten of those arches of varying length when placed side by side cover the whole of the retort, and as the irons are not exposed to heat they bind the structure very firmly.

*Abstract of a paper in *The Journal of the Society of Chemical Industry*, November 29th, 1890.

The fixed and moving disks respectively are made of one diameter, so that when shipped abroad one spare disk of each kind may be sent as a precaution against accident.

That the theory upon which the construction of the machine is based is correct is proved not only by the small amount of coal used, but also by the excellent quality of the distillate produced. The wood used at the Paisley works contains no superfluous moisture to increase the quantity of distillate, and this quantity, which amounts to 140 gallons per ton, is much greater than that produced from air-dried billets commonly used in fixed retorts. The specific gravity of the liquor after settling is about 1·09, or 18° Tw., showing that it contains much hydrocarbon matter; it shows by test between 13% and 14% of glacial acetic acid. The yield of charcoal is 4 cwt., and the amount lost by difference as incondensible gas is only 2 cwt.

The retort which treated shale produced a full yield of oil of an excellent quality, much better than that from fixed retorts. The exhaust steam from the engine which drove it was, without being superheated, passed into this retort. The power required for driving amounts to three horse power for the wood, and five for the shale retort. Two or three tons of seaweed have been treated with this machine and the iodine left in the residue was greatly in excess of that usually found. The quantity unfortunately was too small to afford a test of the capacity of the retort for this purpose.

THE GERMAN COAL INDUSTRY.

A recent number of the *Iron and Coal Trades Review* contained a valuable article upon the German coal industry, from which we make the following abstract: The rapid progress made by Germany during the last 15 years in the field of industry in general, and the coal industry in particular, forms one of the most remarkable features of modern times. The coal output increased so much that the pit owners combined in 1886 and 1887, and formed a syndicate for the purpose of reducing production with a view to raising prices; but, nevertheless, the production continued to increase, and quotations experienced a further fall until, in 1887, they touched $1.27 a ton, the lowest figure on record. In 1888 the average price of coal was about the same as in 1887, but in 1889 it increased to $1.39 per ton.

The following table shows the increase in production since 1872:

Coals.	Tons.	Lignites.	Tons.
1872.....	33,306,400	1872.....	9,018,000
1875	37,436,363	1875.....	10,367,656
1880.....	46,973,600	1880.....	12,144,500
1885.....	58,320,000	1885.....	15,352,000
1888.....	65,386,100	1888	16,487,700
1889.....	67,341,000	1889.....	17,551,400

Consequently the production of coal and lignites together rose from 42¼ million tons in 1872 to nearly 85 millions in 1889, or exactly 100%. The principal increase took place during the last six years, which period showed also the greatest expansion of all other branches of German industry.

The imports of coal and lignite in 1889 amounted to 10,224,175 tons; the exports were 8,874,487 tons.

Prussia is by far the richest coal country of the empire. Her mines contributed over 61 million tons to the total of 67 millions of coal, and 13 millions to the 17 million tons of lignites.

The coal industry employed last year in Prussia 248,251 men, and in the remainder of the empire from 15,000 to 20,000 men; but these figures are necessarily only approximate, though most likely very near the actual numbers. Estimating that 270,000 men are engaged in coal mining, and work 300 days a year, the average annual output would be equal to 270 tons per man, the production varying between 300 tons in Westphalia, 283 in Silesia, and 261 tons in Saarbrücken. Previous to the year 1888 the miners worked not only very long hours, but also over 300 days a year, but recent strikes have produced a slight improvement, and the working days of 1890 will be considerably less than 300. Including the loss of time spent in going up and down the mine, the average daily hours were: 11 in Upper Silesia, 9½ in Lower Silesia, 11 in Saxony, 8 in Saarbrücken, 9½ in Aix-la-Chapelle, 8 in Westphalia, and in very hot pits only 6. The men employed in daylight labor work about eleven hours a day, including meal times.

The average wages paid the miners in 1890 ranged from 57 cents per day in upper Silesia to 80 cents per day in Saarbrücken. The wages, although still very low, are considerably higher than those paid in 1888 and 1889. On an average they represent from 40% to 47% of the selling price of coal. Thus, in 1889, about $48,600,000 was paid the miners for labor out of a total value of $102,060,000. The proportion was about 10% greater in 1890, but even then a German coal miner working 300 days in the year earns only about $194 for himself and his family.

Although the rise of prices from 1888 to 1889 was a very moderate one, the trade took undue advantage of the anxiety which seized the great consumers on account of the great strikes in the spring of 1889. The German community at large, unaccustomed to labor disputes, jumped at once to the conclusion that fuel would not only be dearer, but also scarce, and as stocks in private hands were low, a rush to buy took place. In anticipation of difficulties quotations rose 80% between October, 1888, and October, 1889, and another 20% during the first quarter of 1890.

This extraordinary rise was quite out of proportion to the enhanced wages, and was in reality the consequence of a powerful "cornering" organization, producing widespread complaints, which even led to discussions in the Reichstag, but nevertheless prices are still 50% to 60% in advance of 1888. The movement to restrict the output has, on the other hand, completely failed, as, for instance, the Westphalian production amounted to 17,558,794 tons in the first six months of 1890, compared with 15,518,293 tons during the corresponding period of 1889. Nor is this considerable increase unwarranted considering that stocks at the pits are quite insignificant and reduced to about 80,000 tons, or less than a single day's consumption. This state of affairs is, however, to a great extent due to the fear of new strikes and less to the activity of trade. Railways, mills and merchants are all anxious to accumulate stock in order to be prepared for all eventualities.

The German coal export is at the same time diminishing. For the first eight months of 1890 it was only 5,900,000 tons. Even Italy, one of its principal customers, has reduced its annual purchases to between 80,000 and 100,000 tons, a circumstance which shows that German coal cannot compete with English in neutral markets. The principal object of German producers now seems to be to maintain prices, and steps are being taken toward the formation of a selling syndicate, to which all members are bound to transfer their orders, abolishing competition. Another association has been formed for the purpose of counteracting the recurrence of strikes, but the miners, fearing the consequence of being left entirely at the mercy of their employers, have combined to resist them. Thus the outlook for a peaceful and remunerative development of the German coal industry is anything but bright.

A Crack-Filling Alloy.—An alloy that expands when solidifying and therefore, is valuable to fill cracks in iron castings is, according to *Revue Industrielle*, produced by fusing together nine parts of lead, two of antimony and one of bismuth.

Underground Water-Supply.—In a paper read at the meeting of the American Association, Prof. J. E. Siebel sought to show that certain fixed relations exist between the quality of a water and the geologic horizon from which it is derived in a given locality, and that by measuring and analyzing supplies of different depths, with proper precautions, considerable information can be obtained. In applying his method to the underground water-supply of Chicago, the author found that at least six waters could be differentiated in that neighborhood, each having a well-defined and pronounced character.

Magnesia in Cement.—In a paper, "Magnesia in Portland Cement," in *Chemiker Zeitung*, Mr. R. Dyckerhoff, the author, points out the dangerous character of cements rich in magnesia, their tendency being to expand slowly after setting, careful measurement of their expansion giving also only doubtful indications unless at least half a year has elapsed since gauging. He is disposed to fix the maximum permissible amount of magnesia in Portland cement at 4%, and the Association of German Cement Manufacturers has formed a committee to report on the subject; such makers as are using dolomitic material being specially interested.

Compelling Corporation to Declare Dividend.—A court of equity will not compel a corporation to declare a dividend at the suit of a stockholder, when it appears that, although in a prosperous condition, its affairs are in such shape that it would be required to borrow money or impair its capital to pay the dividend. A court will not interfere in the management of a corporation unless it clearly appears that the directors are guilty of fraud or that they willfully refuse to declare a dividend when it could be done without injury to the affairs of the concern.

Hunter v. Roberts, Thorp & Co., Supreme Court of Michigan, 47 *N. W. Rep.* 130.

Deep Bore-hole.—According to a lecture delivered by Mr. Mohs in the Society of German Engineers, the deepest bore-hole of the earth is found in the province of Saxony. It has been made by the Prussian administration of mines, in the general interest of the country, for the eventual opening of coals near the village of Schladebach, near the stopping-place Kötschau on the railway line Corbetha-Leipzig. The total depth of this bore-hole, which has been made with a hollow diamond rock-drill and water-flushing during three and a half years, is 1,390 meters, its lower width 48 millimeters and at the top 280 millimeters. The expense amounted to more than 100,000 marks.

Manganese Bronze Tubes.—A manganese bronze tube similar to those used in hydraulic gun carriages was recently subjected to a severe test by Armstrong, Mitchell & Co., England. The tube was 4·9 inches outside diameter, 0·3 inch thick and 18 inches long. An internal pressure of 4,000 pounds per square inch was applied without increase of outside diameter; 5,000 pounds pressure produced an enlargement of 0·03 inch; 6,000 pounds pressure increased the diameter 0·08 inch. The testing pump could not go beyond this pressure, so the tube was turned off to an outside diameter of 4·55 inches, leaving it 0·125 inch in thickness. A pressure per square inch of 1,000 pounds produced no change of diameter; 2,000 pounds pressure increased the diameter 0·1 inch; 2,500 pounds pressure burst the tube. Two longitudinal specimens were taken from the tube and tested for tensile strength. They gave an ultimate strength of 31·5 tons per square inch and a stretch of 27½% in 3 inches. Some of the advantages claimed for tubes made from this metal are freedom from the pitting and corrosion experienced with steel, and a strength when annealed double that of the best copper. For the same strength manganese bronze tubes weigh about one-half that of copper or brass, and cost about one-third less per running foot.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent Office:

TUESDAY, JANUARY 27TH, 1891.

445,154. Concentrator. Silas Bertenshaw, Black Hawk, Colo.
445,194. Pneumatic Tunneling Apparatus. William H. Paine, New York, N. Y.
445,197. Device for Scouring Metallic Cylinders. Henry Phillips, Newark, N. J., Assignor to the Spiral Weld Tube Company, of New Jersey.
445,202. Pipe-Forming Machine. David A. Ritchie, Cambridge, Mass
445,291. Apparatus for Stamping Billets. Francis H. Treat, Chicago, Ill., Assignor to the Illinois Steel Company, same place.
445,292. Billet Conveyer. Francis H. Treat, Chicago, Ill., Assignor to the Illinois Steel Company, same place.
445,293. Billet Receiving Table. Francis H. Treat, Chicago, Ill., Assignor to the Illinois Steel Company, same place.
445,294. Billet Shears. Francis H. Treat, Chicago, Ill., Assignor to the Illinois Steel Company, same place.
445,300. Machine for Amalgamating Gold and Silver Bearing Ores. John T. Penny and William H. Richardson, Adelaide, South Australia.
445,302. Bridge. Edward W. Serrell, New York, N. Y.
445,331. Apparatus for Making Anhydrous Ammonia. Patrick J. McMahon, New Orleans, La.
445,381. Cupola Smelting Furnace. Carl Sahler, Cologne, Germany, Assignor to the firm of F. A. Herberts, same place.
445,386. Compound Engine. Stephen Wilcox, Brooklyn, N. Y.
445,412. Steam Pump. Danforth H. Royce, and Cyrus Tufts, Columbus, Ohio, Assignor to James G. Pulling, same place.
445,419. Steam Boiler Furnace. Francis G. Bates, Philadelphia.
445,420. Gas Heating Device for Steam Boilers. Martin Boecker, Friedenshütte, near Morgenroth, Germany.
445,472. Separator for Steam. Charles E. Manning, New York, N. Y.
445,488. Alarm for Steam Generators. Frank M. Ashley, Brooklyn N. Y., Assignor to himself and John J. Ashley, same place.

PERSONALS.

Mr. Francis T. Freeland, M. E., of Leadville, Colo., has been in New York during the past week.

John C. F. Randolph, Mining Engineer of this city, has been very ill in London, but is now recovering. He expects to sail for New York in February.

Dr. Andrew C. Lawson, late of the Canadian Geological and Natural History Survey, has accepted a position at the University of California, at Berkeley.

W. Hart Smith, of the firm of Mason & Smith returned on Wednesday from Houghton, Mich where he went to attend the auction sale of the Pewabic Mining Company's property.

In our last issue the name of one of the three representative American engineers to be presented with memorial silver goblets from Deustcher Verein Eisenhuttenleute was printed William P. Thimm instead of William P. Shinn.

Mr. F. L. Higginson, of Boston, Mass., has resigned his directorate of the Calumet & Hecla mining company of Michigan, as he is to be absent in Europe for some time. Mr. Henry L. Higginson has been elected to fill the vacancy.

Director-General Davis, of the World's Fair, has made the following nominations: Prof. John P. Barrett of Chicago, Chief of Electrical Department; J. H. Raynolds of Riverside, Ill., Chief of Horticultural Department; F. J. V. Skiff of Colorado, Chief of Mining Bureau; and Martin Ryan, Secretary of the Electrical Department.

Col. H. S. Haines, general manager of the Plant System of railroad and steamboat lines for many years, and who is also well known through his connection with the work of the General Time Convention, of which he has been thrice elected president, has been elected vice-president of the Plant System. He fills the vacancy on the board caused by the death of Judge W. S. Chisholm.

Mr. J. H. Biles, the naval architect who designed the Inman Line steamships City of New York and City of Paris, the Spanish men-of-war Reina Regente and Destructor, and other well-known vessels, is now in this city. He is superintendent of the Southampton Naval Works. His visit to this country was made for the purpose of studying what American naval architects are doing, and to obtain a practical notion of the workings of great passenger steamships at sea.

President H. W. Cannon, of the Chase National Bank, has been appointed by President Harrison one of the commissioners to examine and test the fineness and weight of the coin reserved by the several mints during the year 1890. Among the commissioners appointed are Senator Aldrich, of the Senate Committee on Finance; T. A. Carter, of the House Committee on Coinage, Weights and Measures; B. A. Gould, of Cambridge, Mass., and Professor John H. Appleton, of Providence, R. I.

An examination will be held by the Civil Service Commission at Washington, D. C., commencing at 9 A. M., on February 3d, to fill vacancies in the Supervising Architect's office, Treasury Department, as follows: 1. Two junior draughtsmen at $3 a day. Men are wanted who have had about two years' practice or study in the principles of architecture. 2. Four senior draughtsmen at from $5 to $8 a day. Men are wanted who are skilled as assistant architects, and the grade or salary of each will be determined by merit after trial in the office. 3. Two draughtsmen who have had practical knowledge of steam and hot water heating apparatus, salary $5 a day. 4. Two draughtsmen, who should be engineers, skilled in ironwork and building construction, salary $6 to $8 a day. Two days will be allowed for the junior draughtsmen and three for the others. Applications should be filed at once.

OBITUARY.

Ex-Gov. Geo. A. Crawford of Kansas, died in Colorado on the 29th inst. He was the founder of Grand Juction, Colo.

Dr. Nicholas Augustus Otto, inventor of the Otto Gas Engine, died from heart failure in Cologne, Germany, on the 27th inst. He was about 55 years of age.

John J. Davis, superintendent of the Tioga Coke Works, and one of the most prominent mining engineers and coke workers in the country, died at Tioga, Pa., on the 24th inst., aged 53 years.

David M. Ford died in Ishpeming, Mich., on Friday, the 23d inst., aged 60 years. At the time of his death he was managing director of the Ishpeming Gold Mining Company, the agent of certain machinery manufacturers and largely interested in Lake Superior gold and iron stocks.

SOCIETIES.

At the annual meeting of the Technical Society of the Pacific Coast, held in San Francisco, on the 23d inst., the following officers were elected for the year 1891: President, John Richards; vice-president, Luther Wagoner; treasurer, George F. Schild; secretary, Otto Von Geldern; directors, Hermann Kower, Rose E. Browne, C. E. Grunsky, Jas. W. Reid and Alpheus Bull.

The Engineers' Society of Western Pennsylvania held its annual meeting Tuesday the 20th inst. in the rooms of the Academy of Science. The treasurer reported receipts for the year amounting to $1,730.30, with expenditures amounting to $1,610.61. The secretary reported a membership of 370. After reports from the chairmen of the different committees, the president, Mr. W. L. Scaife, delivered his retiring address, after which officers were elected for the ensuing year as follows: Col. T. P. Roberts, president; A. E. Hunt, vice-president; J. H. Harlow, secretary; A. E. Frost, treasurer, and Geo. S. Davison and Thos. H. Johnson directors. The following gentlemen were elected to membership: H. Plummer McClintock and Thos. B. McKing. The paper of the evening was by Mr. Chas. F. Scott, the subject being "The Description and Operating of an Electric Coal-plant." Discussion of the paper was postponed until the next regular meeting, February 17th.

INDUSTRIAL NOTES.

The American Ore Machinery Company, of New York, will remove its offices on February 1st from 10 Wall street No. 1 Broadway.

The Snow Steam Pump Co., of Buffalo, N. Y., is about shipping to the Montreal Mine, Hurley, Wis., one of its improved mine pumps having a capacity of 100,000 gallons per day, the water to be raised 1,500 feet. Among other recent orders was a 200,000 gallon elevator pump for the new Rockefellar & O'Day building in Buffalo.

The Board of Electrical Control, New York City, considered the request of the Harlem Bridge, Morrisania and Fordham Company to adopt the trolley overhead electric system as a motive power and gave its consent to the "Huckleberry Road." Mayor Grant, in voting in the affirmative, said he had examined the trolley system in Boston and elsewhere and concluded that, while he might object to the use of the same in the city, he thought it would prove beneficial in the annexed district.

The Washburn & Moen Company have sold their barb-wire patents to the Barb-wire Trust for $400,000, and have been thereby induced to enter the trust, with which they have been carrying on a fight for many years. The result of the combination will probably be an advance at an early date in the price of barb-wire, the claim being made that the competition existing heretofore has had the effect of causing large losses of money to manufacturers.

The barb-wire patents of Washburn & Moen expire in 1894.

A connecting bridge is to be built by Carnegie Bros. & Co. and Carnegie, Phipps & Co. from the Homestead Steel Works to a point on the north side of the Monongahela River near the Carrie furnaces, at Keating station, Pa. The object is to establish direct communication between the two plants. It is said that the direct process of manufacture now in vogue at the Edgar Thomson works will be introduced at Homestead. The iron will be taken in a molten state over the bridge from Braddock in vessels.

The Zig-zag tunnel, 1,627 feet long, on the New York, Ontario & Western Railway Company, near North Walton, N. Y., has just been "holed." We are officially advised that the records of 306 feet in October and 345 in November, 1890, 10×20 feet heading, have seldom if ever been equaled. The November run of 345 feet is the greatest on record in America. Three drills were used, two of them being the new "Sergeant" pattern, made by the Ingersoll-Sergeant Drill Company, of New York City. H. R. Wheeler, formerly of the Croton aqueduct, was engineer in charge of this tunnel.

The Cambria Iron Company, Johnstown, Pa., has posted the following notice about the works, and it is presumed the same has been issued at all places where the company has interests:

Office of CAMBRIA IRON COMPANY,
JOHNSTOWN, Pa., Jan. 19, 1891.

To enable the company to meet the great decline in the selling price of its products, it is reluctantly forced to make a general reduction of about 10% on all salaries and wages, to take effect on and after February 1st, next.

JOHN FULTON, General Manager.

The extensive furnaces, rolling mill and mineral lands of the Valentine Ore Land Association were sold at an adjourned sheriff's sale on the 29th inst., under a foreclosure of the mortgage by the bondholders. The first lot, consisting of the furnaces and rolling mill properties, sold for $100,000, and the second, consisting of the real estate and ore properties, brought $95,000. Both were bid in by Mr. J. M. Gephart, of the firm of Beaver, Gephart & Dale, for the Fidelity Trust and Safe Deposit Company, of Philadelphia. These properties were formerly operated by the Centre Iron Company, which failed not long ago.

The extensive furnaces, rolling mill and or properties of the Valentine Ore Land Association are reported to have been sold at an adjourned sheriff's sale yesterday under a foreclosure of the mortgage by the bondholders. The first lot, consisting of the furnaces and rolling mill properties, went for $100,000, and the second, consisting of the real estate and ore properties, brought $95,000. Both were bid in by Mr. J. M. Gephart, of the firm of Beaver, Gephart & Dale, for the Fidelity Trust and Safe Deposit Company, of Philadelphia. These properties were formerly operated by the Centee Iron Company, which failed not long ago.

It is reported that during the past week the Crane Iron Works at Catasauqua, next to the largest pig iron producing establishment in Eastern Pennsylvania, was sold to an English syndicate for $3,500,000. Besides the five furnaces of the company at Catasauqua the purchase includes the Warwick Iron Works at Pottstown, Pa., the valuable ore mines of the company at Seishaltzville, Pa., and leases on furnaces at Edge Hill and Macungie, together with all raw material, rolling stock and the Catasauqua Water-Works. The negotiations have been pending for a year. No immediate changes in the management will be made.

The President on the 26th inst. sent to the Senate a letter from the Secretary of War transmitting the final report of the board on gun factories and steel forgings for high-power guns. The report states that there are only two places in the United States possessing the necessary machinery and appliances for producing heavy steel forgings, both of which are in Pennsylvania. At the present time, says the report, steel forgings now used in this country are imported, and the amount of such imports is considerable. The report discusses at length the feasibility of locating a gun factory in different sections of the country, but makes no definite recommendation as to a site.

Report reaches us that the contracts which the Thomson Electric Welding Co. has made with the Army and Navy departments of the United States are for shrapnel, armor piercing shell and common shell, and are large enough to keep a factory going for at least six months. Besides these there are other orders which, it is said, will tax the facilities of the company after the government contracts are filled. The plans are drawn for a new factory 100 by 60 feet, to be built at Lynn in the rear of the old plant, and to be supplied with power from the latter. It is calculated that the extension can be built and equipped in about 60 days. A new company, to be controlled by the Thomson Electric Welding Company, will be at once organized. The shareholders of the present organization will be preferred subscribers to the stock of the new concern.

At the Cressona Powder Works, Cressona, Pa. an explosion of 250 kegs of gunpowder occurred recently in the barrel mill of these works, the immediate cause being unknown. The powder works consist of the barrel mill, press house, corning room and glass mill. The powder upon leaving the barrel mill passes into the press house, where it is pressed into cakes under a pressure equal to 1,700 pounds, from this into the corning room, where it is ground between heavy brass rollers, and then placed in large drying cylinders in the glazing department. It is packed in cans for market. The powder mills were formerly operated by the Laflin & Rand Powder Company, but early last summer were purchased by a stock company, in which Asa Smith, of Schuylkill Haven, and ex-Sheriff William Matz and Frank Rahn, of Cressona, are interested. No one was injured.

Chairman Burrows, from the House Committee on Levees and Improvements of the Mississippi River, on the 24th inst. submitted to the House a favorable report on a bill drafted by the committee to appropriate $10,000,000 to repair and build the levees on the Mississippi from the head of the passes to Cairo, to be expended in accordance with the plans of the Mississippi River Commission. The report says that the opinion formed by Congress in 1880, that the levee system would form an important auxiliary in channel improvement has ripened into the conviction in the minds of a majority of the commission in charge of the work that a continuous line of levees, sufficient to confine the overflow waters to the channel, is indispensable. The overwhelming weight of testimony in the opinion of the committee, is that the Mississippi can best be improved by providing a current sufficient to scour out the channel.

The rapid transit bill, which passed the Senate last Wednesday, came up for a second and third reading in the House of Representatives to-day, and now only awaits the signature of Governor Hill to become law. The history of the attempt to obtain necessary rapid transit legislation for New York City is interesting. For more than three years there has been an urgent demand for a system commensurate with the city's needs, but so many private interests were affected that it was impossible to get a law passed.

Early this winter it became evident that the demand could not be disregarded any longer. It was heard on every side. As soon as the legislature session began the subject was brought forward and it has since occupied the attention of b

houses. Three bills were under consideration, and there was some fear of a repetition of last year's fiasco, which, however, has happily been proved groundless by the action of both houses during the past week.

CHICAGO INDUSTRIAL NOTES.
(From our Special Correspondent.)

The Columbia Car Company has finally cleared the last title involving any part of the 570-acre tract recently purchased, and the work of constructing the permanent shops has begun. Five car loads of machinery have been received lately at the temporary works. At these shops work on sample steel cars is already in progress. The new shops are to be located in the northwest quarter of section 28. The entire length of the shops from east to west is to be 660 feet. A cross line will be laid through this property between the Chicago & Northwestern and the Wisconsin Central railroad tracks. The dimensions of the new plant are to be: paint shop, 200×72 feet; two erection shops, 200×72 feet; road shop, 140 × 48 feet; machine shop, 100 × 48 feet, and blacksmith shop, 80 × 72 feet.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from his office. No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

2,037. A portable railway of about 565 yards, with crossings and six tipping cars. Alabama.
2,038. Catalogues, price lists, etc., of steam laundry machinery. Texas.
2,039. A complete outfit for a slate quarry, including boiler, hoisting engine, derricks, saw tables, rubbing bed, planing machine, emery wheel, etc. Virginia.
2,040. Two 70-saw gins. Texas.
2,041. About 200 feet of different sized belting. Texas.
2,044. An improved push planer and lock corner box machinery. Virginia.
2,045. Catalogues and price lists of cotton gins, latest improved. Georgia.
2,046. Cotton seed oil mill. Georgia.
2,047. Mill to make syrup from cane. Georgia.
2,048. Catalogues, price lists, etc., of rock crushers. Arkansas.
2,049. Circulars, prices, etc., from manufacturers of steel tug boats and barges. Arkansas.
2,050. Machinery for crushing and grinding kaolin, including motive power. New York.
2,051. Rails and equipment for 40 miles of railway. New York.
2,052. Engine and boiler. Maryland.
2,053. Full set of wood-working machinery. Maryland.
2,054. Machinery for a beet-sugar factory. Nebraska.
2,055. Prices on a 5 or 10 stamp mill. Arizona.
2,056. Machinery for a 500-barrel flour mill to be run by water power. Georgia.
2,057. A 22 × 36 horizontal Corliss or Green engine. Pennsylvania.
2,058. A 12-foot 30-inch face band-wheel, weighing about 8 tons. Pennsylvania.
2,059. A 6-foot 30-inch face-band wheel to weigh about 3 tons. Pennsylvania.
2,060. An 8 or 10-foot fly-wheel, weight about 5 tons. Pennsylvania.
2,061. A 12-inch train of rolls, consisting of six housings, pinions for rolls, etc. Pennsylvania.
2,062. A 9-inch train of rolls, consisting of 10 housings, pinions, rolls, boxes, spindles, etc. Pennsylvania.
2,063. Two 42-inch diameter, 25 to 30 feet plain cylinder boilers. Pennsylvania.
2,064. A pair small lever shears. Pennsylvania.
2,065. A saw for cutting large flats, rounds, etc. Pennsylvania.

AMERICAN GOODS WANTED ABROAD.

2,042. Catalogues and price lists of sugar machinery. Mexico.
2,043. Catalogues and full particulars as to export prices of mining machinery. South America.
2,056. American lumber for manufacture of furniture including black walnut, ash, cherry, oak, pine, Georgia pine and mahogany. Germany.

GENERAL MINING NEWS.

ALABAMA.

Reports state that a 25-barrel oil well was struck on the 24th inst. in Mountain Valley, 40 miles from Florence. This has renewed the interest there in boring for oil. Several companies secured options on large tracts of land last year, but have never developed them.

ARIZONA.

(From our Special Correspondent.)

PIMA COUNTY.

CROCKER MINING COMPANY.—The annual meeting of the company took place this week, there being 84,134 shares of stock represented. Several changes took place in the directorate, the following board being elected to serve during the ensueing year: W. S. Lyle, president; C. H. Fish, vice-president; E. W. Havens, A. B. Chute and E. Gauther. Nat T. Messer was elected secretary. The financial statement submitted showed a cash balance of $2,040.63 on hand.

PINAL COUNTY.

D. REYMERT MINING COMPANY.—The lack of water has handicapped the management very much, and now for the same cause the mill has closed down. The ore in sight is sufficient to keep an 80-stamp mill going. But it has been with some difficulty that the 20 stamps could be kept in operation through the season, and now they, too, are hung up. During the year 1890 the mine yielded silver bullion valued at $95,189.80.

YUMA COUNTY.

PAYMASTER MINING COMPANY.—This company, which operates the Cargo Muchacho mine, is reported to have raised the wages of its miners from $3 to $3.25 and $3.50, according to the man's ability.

CALIFORNIA.

(From our Special Correspondent.)

SAN FRANCISCO, Jan. 23.

Governor H. H. Markham, in his inaugural address had the courage to suggest a revival of hydraulic mining in this State, and advised that steps be taken to memorialize Congress at the earliest possible moment with the end in view that the whole subject be considered by a commission and, if possible, some means be devised by which the rich deposit of gold may be obtained without detriment to farm owners in the valleys or injury to the navigation of certain streams. The Governor's words have struck a popular chord in many parts of the State, and on Friday last 18 legislators, senators and assemblymen, called upon him for the purpose of thanking him for the stand he had taken in the matter. The preliminary steps are already being taken to carry into effect the advice given that Congress may send a committee to California to study the problem scientifically and devise some means of resuming work.

COLORADO.

Mineral surveys approved by the United States Surveyor General of Colorado, during the week ending January 24th, 1891: Sur. No., 6,754; Land District, Durango; Name of claim, Florida lode; 6,803, Garfield, Hayden; 6,797, Central City, Brailla and Timber Line; 6,752, Leadville, Norwalk and Derby; 6,798, Leadville, Allen, Eastern and Block; 6,767, Central City, Pride of the West; 6,817, Garfield, Cora May and Cora May No. 2; 6,490, Leadville, Fourth of July; 6,499, Gunnison, Chronicle; 6,725, Durango, C. V. G.; 6,394, Durango, Thompson; 6,726, Durango, A. B. G.; 6,451, Durango Jumbo; 6,512, Durango, Aspen and Last Chance; 6,825, Leadville, Mammoth and Yorktown; 6,775, Central City, Elm City; 6,578, Garfield, J. B. Grant. Amended Survey: 4,303, Leadville, Gilpin lode.

LAKE COUNTY.

SILVER CORD COMBINATION MINING COMPANY.—At a special meeting of the stockholders in Leadville, recently, it was decided to endorse the action taken by the directors in issuing bonds, to be secured by a mortgage on all of the company's property, both acquired and to be acquired. The mortgage is to be for $100,000, payable in five years, at 8% interest, payable semi-annually. There were 300,383 shares represented at the meeting, out of a possible 450,000, and many of the stockholders present took a large number of these bonds at once, while the excellent work being done by Mr. A. A. Blow, the manager, was also heartily endorsed. These bonds are issued for the purpose of securing funds to carry out the plans of the management for the handling of the low-grade ores of the property. A large tunnel is being driven to the lowest levels of the mine, from California gulch, and large dressing works are to be erected at the mouth of the tunnel.

ILLINOIS.

ST. CLAIR COUNTY.

CONSOLIDATED COAL COMPANY.—In the case of James D. Baker, Collector of St. Clair County, on application of Assessor Stookey of same township, vs. Consolidated Coal Company for $50 delinquent taxes assessed on coal under ground, Judge Hoy of the Supreme Court of Illinois gave judgment for the State. State Attorney Martin W. Schaefer claimed that when the surface is owned by one party and there is a vein of coal underneath owned by a different party, the coal underneath and the surface must be assessed separately. The present case was only for $50, but the decision of the Supreme Court, affirming the decision of the County Court of St. Clair, will bring into the treasury thousands of dollars each year in taxes from the vast coal fields and establish a precedent for assessing coal lands all over the State of Illinois.

INDIANA.

From reports on the natural gas fields of the State, it appears that at Muncie, Anderson, Mason and other leading gas towns no perceptible diminution of pressure is noticeable. There is an abundance of gas for domestic, manufacturing and illuminating purposes, and there are no indications of a falling off in the supply. Many wells have failed, but wells sunk in close proximity to them are yielding freely. The average life of a well which is drawn upon for its full flow is only about three years. After that time the wells are liable to choke up with oil or water, although some of the first which were sunk in Indiana are still flowing as freely as ever. The cities and towns outside the gas fields to which gas is piped report a declining pressure and in only one or two of these places are the companies able to supply gas to manufacturers continuously. With more wells and a very much greater pipe capacity these towns could probably double their supply and secure an abundance of gas for all purposes, but the great cost of the plants and the heavy leakage through long pipe lines make it doubtful whether the carrying of gas for any considerable distance for other than domestic uses can be made commercially profitable.

KANSAS.

CHEROKEE COUNTY.

A special report shows that during the week ending January 17th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,422,010, zinc ore, pounds sold, 495,000; lead ore, pounds sold, 274,470. Sales aggregated a total value of $11,711.

LOUISIANA.

LAFAYETTE COUNTY.

Coal has been discovered within the city limits by Israel Falk, who was boring for petroleum. The coal was cut at a depth of only 50 feet. If the deposit proves to be of importance the discovery is a most important one, as the famous salt mine of Petite Anse is only 10 miles distant, and the sulphur mines of Caleasieu, 76 miles.

MICHIGAN.

COPPER.

ALLOUEZ MINING COMPANY.—Treasurer John Stanton, of this company, has issued a circular giving notice of the assessment of 50 cents per share, payable February 26th, and among other things says that the altered condition of the copper market, the price having largely declined, while the metal is not so readily converted into money, makes it necessary to provide more working capital, in order that work may be vigorously prosecuted, and sacrifice of the product of the mine be avoided; the directors believe that the call made is for the best interests of the stockholders and for the benefit of the property. The financial condition of the company December 31st, 1890, was approximately as follows, viz.:

ASSETS.

Cash in bank		$7,405.1
Copper bills, not yet due		20,351,18
Copper on hand, in transit and at smelting works, about 347,000 pounds, valued at 15 cents		52,050.00
At mine.		
Cash	$166.33	
Supplies	12,350.10	
Cordwood and timber	16,067 94	
Accounts receivable	246.29	28,830.66
Total available assets		$108,636.99

LIABILITIES.

Agents' drafts	$27,743.19	
Indebtedness at mine	24,815.47	
Smelting, freight and other bills	6,511.78	
Loans	36,000.00	95,074.44
Balance of available assets		$13,566.55

In conclusion, Mr. Stanton says: "Work at the mine is now progressing smoothly, and the stamp mill receives a full supply of rock. Improvements are about completed, and no further outlay in this direction is now contemplated. The "Calumet conglomerate" has been reached by our exploring crosscut, and found to be narrow, and to carry very little copper at that point (about 60 feet from surface); yet the test is by no means conclusive, and it would seem that further exploration would be advisable, and should be undertaken when a favorable opportunity offers."

CALUMET & HECLA MINING COMPANY.—The Red Jacket shaft is now down 2,280 feet. A second cross-cut has been started, which is calculated to reach No. 4 shaft at the 38th level. The cross-cut at the 36th level was to a great extent driven toward the Red Jacket shaft, but this cross-cut is to be driven east from the Red Jacket shaft, and so No. 4 shaft is not needed for hoisting the dirt from the cross-cut. We understand the two shafts are to be connected at every second level. The vertical shaft comes nearer the load as it increases in depth, and is expected to intersect the latter at the 60th level of the old mine.

At the Calumet end of the mine only three shafts are now left, viz: Nos. 2, 4, and 5, No. 1

having been closed and the shaft-house taken down since the fire in No. 3 shaft. No. 2 shaft is down below the 37th level, No. 4 to the 42d level, and No. 5 half way between the 39th and 40th levels, and is reported to be in very rich ground. This, together with the fact that the drifts going north at the 38th and 39th levels are in good ground gives encouragement to the shareholders in Tamarack Junior, as well as to those of the Centennial. The 38th level is in some 280 feet, and the 39th about 120 feet.

A building has lately been erected between No. 4 and 5 shafts, and the foundations for another engine which it is expected will run the man-car in No. 4 shaft are being put in. The engine which now runs the man-car in that shaft will be employed in running the proposed man-car in the No. 2 shaft. It has been roughly estimated that about one-third of the 24 hours is now occupied in lowering the men into and hoisting them from the mine.

PEWABIC MINING COMPANY.—This company's property, located at Hancock, Houghton County, was sold by Peter White, a master in chancery, acting under instructions from a United States court, at a public auction held in the village of Houghton on the 24th inst. The purchase was made by the firm of Mason & Smith, of 52 Broadway, this city, in consideration of the sum of $710,000.

The Master in his last report estimated the debt of the old company to be $50,000. Adding to this sum the cost of the sale, it is quite probable that the stockholders will realize the sum of $600,000 on the property. This is equal to $15 per share. It is said that the purchasers represent interests owning over one-half of the Pewabic stock. Inquiry at the office of Mason & Smith and of the Quincy Mining Company, by a representative of the ENGINEERING AND MINING JOURNAL, did not elicit any definite statement as to the probable disposition of the property, although the impression was conveyed—and it was a strong one—that the property would not be worked independently, but would be sold to the Quincy Mining Company. It was learned that the last named company has taken no official action in the matter.

The property is still in the hands of Special Master Peter White and will remain in his charge until the court issues the final papers confirming the sale.

The history of this property is closely allied to the early institutions of the copper country; its career since 1883 has been known only through the courts. The Pewabic Mining Company was organized in 1853. By statute limitation the charter expired 30 years after, or in 1883. The only course of procedure left open for the stockholders by court rulings was the organization of a new company. One was formed under the name of the Pewabic Copper Company, and a meeting of the stockholders of the Pewabic Mining Company was held to act upon the transfer of the old company's property to the new corporation. A majority of stockholders voted in favor of the transfer on a $50,000 valuation of the mine. This valuation was regarded by a minority of the stockholders as ridiculously low, and an emphatic protest was made and culminated in an application made to the United States Circuit Court for an order enjoining the action. A temporary injunction against the sale was served before the transfer deeds could be recorded in Houghton County, the site of the property.

The case came up in 1885 before Justice Mathews of the United States supreme bench. The minority stockholders asked for a permanent injunction against the transfer and petitioned the court for a decree ordering an accounting of the company's affairs. The injunction was granted and the decree denied. The case was then taken to the Supreme Court, where the minority stockholders filed a cross appeal for an accounting. This tribunal sustained the decision of Justice Mathews granting the injunction and reversed his decision refusing an accounting. The case was remanded to the lower court, Judge Severens presiding. This court in accordance with instructions, ordered a public sale. The sale was twice postponed on various pretexts. A petition signed by a minority of the stockholders for a third postponement of the sale fixed for January 24th, was refused by Judge Severens on the 16th, and by the United States Supreme Court on the 22d inst.

When organized the company owned 1,205 acres in sections 9, 10 and 25, town 55 N. R., 34 W. The mine was opened in the northwest corner of section 25 on the Pewabic lode. Active mining operations were commenced in 1862 under the supervision of Mr. Charles Palmer, father of Mr. Chas. Palmer, the present superintendent of the Butte & Boston Mining Company, Butte, Mont. During that year the mine paid $100,000 in dividends, leaving a surplus of $60,000 in the treasury as a working capital. At the beginning of 1867 the sum of $380,000 had been paid in dividends, a new shaft was sunk on the Albany & Boston lode.

The company's property was rapidly converging between the Franklin and the Quincy holdings, located on either side. In 1870 work on company account was suspended, and the mine, together with its neighbor, the Franklin, was leased to Capt. R. Wren for a period of four years. A quarter of section 23 was purchased of Messrs. Edwards in 1879 for $229,000, and was paid for by a $10 assessment. This acquisition gave the company a new lease of life. During the time which the mine was worked it produced 13,894 tons 620 pounds of mineral. It has called in assessments the sum of $706,000 and paid $460,000 in dividends.

(From our Special Correspondent.)

The bidding at the sale of the Pewabic was more spirited than was expected. Although last autumn the mine could have sold at $1,000,000 or more, yet it was not expected at this time, with the general copper market showing so little signs of life that the property would net more than half a million. That it should have sold at the price which Mason & Smith bid for it, $710,000, is taken as an indication that Eastern copper men regard the situation without apprehension. The first bid was made by Hon. Don M. Dickinson on behalf of the majority stockholders in the Pewabic Mining Company. It was $250,000, and was rapidly followed by a bid of $275,000 from the representive of the Franklin Mining Company. The Quincy Company then appeared in the person of Superintendent Harris, who bid $300,000. The competition between the two companies was sharp and bids quickly mounted to $475,000, when a bid of $500,000 was made by W. Hart Smith, of New York. When Mr. Smith raised the Franklin's bid of $701,000 to $710,000 the Franklin dropped out and the mine was knocked down to Mr. Smith.

MENOMINEE COUNTY.

[*By Telegraph.*]

IRON MOUNTAIN, Jan. 30.

CHAPIN MINE.—At about 6 o'clock last night the mine took fire in the sixth level. Its origin is unknown. Smoke is pouring from four of the shafts and it is feared that great damage will be done. All the shafts have been closed. Two lives are certainly lost, and possibly others.

IRON.

METROPOLITAN IRON AND LAND COMPANY.—At the annual meeting of the stockholders of this company, in Milwaukee, Wis., Solomon S. Currie, Stephen Clement, O. W. Potter, H. S. Haselton and J. A. Whaling were elected directors. The officers elected were: President, Solomon S. Currie; treasurer, L. J. Petit; secretary, H. S. Haselton. The shipments for the year from the mines operated by this company aggregated 1,080,175 tons. The dividend was not ordered paid, but one is expected at an early date, and it is said that it will be a large one.

(From our Special Correspondent.)

HURLEY, Jan. 27.

ANVIL MINING COMPANY.—The property of this company will be explored under the dike by a diamond drill. Arrangements for the work have already been made.

On account of the serious outlook for next season, nearly all the mines are cutting down their forces to the lowest possible point.

MARQUETTE RANGE.

(From our Special Correspondent.)

MARQUETTE, Jan. 27.

ELBA MINING COMPANY.—This company's shaft is down 110 feet, and from its bottom the north drift is in 44 feet or about 12 feet from the lens discovered by the diamond drill about three months ago. Ore of a good quality has been reached in the west drift from the north branch. There is good prospect that actual mining work will begin at the Elba next summer.

IMPERIAL IRON COMPANY.—At the Imperial mine the hematite has heretofore been sufficiently soft to be easily mined by hand drilling and picking. But at a depth of 240 feet, which the west pit has now attained, the ore has quite abruptly changed to a harder condition, and power drilling has become necessary. A compressor plant is now being arranged for. The mining in the west pit has so far been open pit work, but a shaft on the foot wall following the dip of the ore will be commenced as soon as the compressor plant is ready, perhaps before. In the east pit, a shaft is already 40 feet below the open pit, sinking having been commenced two months ago. At a point 470 feet west of the west pit, a new shaft was commenced this week. It will be sunk 50 feet in the dip of the vein before opening out or stoping will be commenced. Its dimensions are 8 × 12 ft. When the shaft system is in general use at the mine, the ore will be taken out one level at a time from the top downward, the surface being allowed to settle into the openings, a system which has already given such excellent results at the soft hematite mines of the Schlesinger-Negaunee group. One hundred and fifty men are now employed. The company has about 14,000 tons in stock, and is mining about 6,000 tons per month. By the opening of navigation it is expected to have 35,000 tons of ore in stock. The company holds 160 acres, comprising the southeast quarter of section 25, town 47 north, range 29 west. Mr. Richard A. Parker is general manager, and Mr. J. C. Trembuth is in charge at the mine.

NORMAN IRON COMPANY.—The annual meeting of this company was held at Negaunee last week and the following officers were elected: President, G. B. Kirkwood; secretary and treasurer, Ira A. Clark; C. B. Kirkwood, A. C. Sears, Norman McLeod and E. C. Anthony, directors. The option of the Monongahela Mining Company to explore the lands of the Norman Iron Company was renewed.

MISSOURI.

JASPER COUNTY.

ASTOR LEAD AND ZINC COMPANY.—About seven years ago this property, situated about one and one-half miles from Joplin, on the Turkey Creek Mining Company's lease, was opened up by the Warren Bros. and Samuel Dorsey. Repeated attempts were made to make the mine pay with hand jigs; but the result was very unsatisfactory. On February 24th, 1890, Samuel Dorsey sold to J. D. Houseman, Jr., and his St. Louis associates. A company with a capital stock of $50,000, styled as above, was organized a little later and a concentrating plant erected at a cost of $3,000 did good work, proving the fact that the mines could be made to pay handsomely with the aid of steam crusher and jigs. Late in May the manager, Mr. B. von Phul, bought out his St. Louis partners and J. D. Houseman, thus becoming the sole owner, and in August foundations were made for the present enlarged plant, which consists of an 18-inch jaw crusher, two sets of rolls, and four jig tanks. Ponds are used to save the mineral in the sludge, and the mill has a daily capacity of 20 tons, giving employment to two shifts of five men each. The water flowing from the Tuckahoe and Zinc Hill mines on the north is dammed, purified by passing through four 15-foot × 15-foot filtering tanks, and then elevated by a 750-gallon per minute Hughes duplex pump to the top of the concentrator. A large amount of ore is reported in sight. Eight shafts, one of which is down 140 feet, have been sunk to prove the continuity of the deposit. Two are supplied with Cornish pumps and are used for raising ore. Four hundred large sized tubs are filled and hoisted during each shift.

(From our Special Correspondent.)

JOPLIN, Jan. 26.

The past week has been favorable for mining operations and the output of ore very large. The price of zinc ore has gone down a point, however, the average price being but $23 per ton, although some extra fine grades brought $24. Many of the large operators are storing their ore for better prices. The price of lead ore declined to $24 per thousand. Following are the sales from the different districts, as far as reported:

Joplin mines, 1,139,980 pounds zinc ore and 183,340 lead; value $17,498.

Webb City Mines, 544,080 pounds zinc ore and 92,270 lead; value, $8,471. Carterville Mines, 1,340,740 pounds zinc ore and 134,310 lead; value, $18,641 95. Zincite Mines, 182,160 pounds zinc ore and 1,900 lead; value, $2,151.94. Lehigh Mines, 43,120 pounds zinc ore; value, $495.88.

Oronogo Mines, 16,090 pounds lead: value, $386.16.

Galena, Kans., mines, 495,000 pounds zinc ore and 274,470 lead; value, $11,711. All districts, total value, $59,355.93.

The Spelter output for the week ending January 24th was as follows:

R. Lanyon & Co., Pittsburg, Kan	178,000	pounds.
S. H. Lanyon & Bro., "	97,000	"
Granley M. & S. Co. "	96,500	"
W. & J. Lanyon. "	96,600	"
Weir City Zinc Co., Weir City, Kan	140,000	"
Total	608,100	

The coal output for the same week was 900 cars, aggregating 18,000 tons.

The Jasper Mining Company is now operating two shafts on its property, and producing at the rate of 60 tons of zinc ore per week. The Tnucker Mining Company, located within the city limits of Jopins, is operating seven shafts, all of which are in good ore, and are steady producers.

The Little Nugget Mining Company, operating on the Sterling Lead and Zinc Company's land, is sinking a new development shaft. They have now about 400 feet of levels, and have recently drifted around a block of ore 68 feet long, 61 feet wide, and 14 feet thick. Ore is showing on both sides of the drifts also.

Lea Brothers, of Atchison, Kans., recently purchased two mining lots on the Jasper Company's land. They have just completed a plant of machinery and will commence prospecting at once.

Mr. P. L. Swartz, who recently purchased 40 acres of undeveloped land north of the city, has just opened a large body of lead and zinc ore.

Lowe & McAbee have struck a body of lead and zinc ore on a tract of land east of the city at a depth of 112 feet.

The No. 20 shaft of the Empire Zinc Company at Blendeville is now down 78 feet and two drifts have been started. A 12-foot body of zinc ore was struck at a depth of 60 feet. From No. 18 shaft, 60 feet deep, a drift is also being driven in a 12-foot face of ore.

The Diamond Lead and Zinc Company has opened a 16-foot body of zinc ore, reported to be of high grade, in its new shaft. The production of this company from all mines during the week was 117,160 pounds zinc and 5,000 lead ore.

The Petri Company is sinking a new shaft to open the same run of ore found in the old workings.

Girard Brothers, operating on the Empire Zinc Company's land, produced 50 tons of clean zinc ore during the last nine days' work.

The Annie Baxter mine on the Mahaska land is improving. During the past fortnight it produced 45 tons of zinc ore and 32,000 pounds of lead.

A good strike of ore is reported in the Choctaw

mine on Snyder Brothers' property. Last week it turned in 18 tons zinc ore and 3,000 pounds lead ore.

MONTANA.

BEAVERHEAD COUNTY.

HECLA CONSOLIDATED MINING COMPANY.—Advices from Glendale announce that the bullion product of this company for 1890 amounted to ounces fine gold, 691,487/1000; ounces fine silver, 480,904.34/100; pounds copper, 159,981; pounds lead, 4,293,170.

DEER LODGE COUNTY.

BIMETALLIC MINING COMPANY.—It is reported that about ten days ago this company cut the north vein at a depth of 800 feet in the main shaft on the James G. Blaine lode, and that the drift on the vein, nearly 1,300 feet west of the shaft and very close to the Elizabeth Company's east end line, shows nearly 4 feet of very rich ore. The collar of the James G. Blaine shaft is located about 200 feet south of the lead, which, it is supposed, has been struck at the 800-foot.

CHAMPION MINING COMPANY.—The practice of using steam drills is slowly becoming more common in Montana. Three companies operating in Oro Fino district are now using them—the Ruby, Lion and Champion. The character of the formation in these mines is such that a great saving in both time and money is thus effected. The Champion drill is employed in sinking the shaft from the 475 to the 700-foot level, and the one recently added to the Lion's equipment is proving an unqualified success. From 3 to 4 feet daily is made with the drill as against 10 to 12 inches in the same formation by the old method. It is reported that a vein on the 350 North, to tap which a cross-cut has been in progress several weeks, has recently been encountered, but proved not to be as rich as anticipated. It is believed that the main vein lies still farther north, and on the strength of this belief the cross-cut will be continued for a time.

EAST GRANITE MINING COMPANY.—The group of claims on which this company started work hardly more than a month ago consists of the New Departure, Montreal, Boston, Welch and Black Rock. From its very inception this company has continued to attract the attention of all interested in mining on Granite Mountain. The idea that the Granite leads were the only ones in the district seems to have had many believers, and some people have been very busy trying to give the public the impression that even those veins were confined to Granite and Bi-Metallic ground. The East Granite Company developments now give fair promise of another great ore-bearing vein running parallel with and south of the Granite. A solid body of ore about three feet wide has been uncovered in the 70-foot cross-cut. Between decomposed granite walls the ore is comparatively low grade as yet and so near like the same character of ore found in the Granite that they cannot be separated when placed together. The future development of the property will certainly be watched with great interest. Contrary to expectations, water was encountered a little below the 70-foot cross-cut, and it has become necessary to use a pump. Cars, etc., were expected to arrive during the past week at the Philipsburg depot and will be placed in position at the mine immediately. The shaft will then rapidly be sent down to the 500-foot level.

LEWIS AND CLARKE COUNTY.

THE ELKHORN MINING COMPANY.—A cable from Superintendent Plummer to this company's home office in London, England, announces that the bullion shipped for the week ending January 10th was valued at $9,000.

MADISON COUNTY.

PONY GOLD MINING COMPANY.—According to report, Elling & Morris have reached the Willow Creek vein through a crosscut tunnel 700 feet in and at a depth of 225 feet. The vein is 20 feet wide. Assays have not yet been made, but drifting will begin at once. The Elling & Morris foreclosure sale against the company, which was to have taken place on the 5th instant, had to be postponed on account of an error in the advertisement. The amount of the judgment against the company is $150,000. It is generally supposed that the plaintiffs will bid in the property, which consists of 13 mining claims, several mill sites, a placer claim, and in fact all the realty which the company bought of Elling & Morris a year and a half ago. The tunnel which has been in progress for some time to tap the Keystone and Strawberry veins at a depth of 400 feet is now in 300 feet, and it is expected that it will strike the keystone vein within the next and the strawberry about 400 feet further on. The tunnel is being worked under contract by the Conners Brothers. The rock is diorite, of the hardest kind, with the formation lying flat, making advance just so much harder. The Grippe tunnel, which has been run in to catch the Clipper vein, is at present 350 feet long, and cross-cutting for the vein will soon commence.

MISSOULA COUNTY.

O. R. AND N. COMPANY.—The shaft on this property has been sunk 300 feet and the vein cross-cut at three different levels. Several veins of gray copper ore, whose aggregate thickness is nine feet, have been exposed. A large amount of ore is said to be in sight, assays giving most encouraging results; one of the best prospects in Missoula County. It is said $17,000 has been expended in development work which, however, is hardly shown by the actual work done. Better results are expected from the new management, under the presidency of General George Eaton. Five carloads of ore have been shipped to Omaha for reduction and a working tunnel is being driven to the ledge at the rate of 100 feet per month. The new tunnel will afford a cheap and economical avenue for the stoping of ore—the cost of mining will be reduced to $2.75 per ton. Its proximity to the railroad is another important factor in the development.

SILVER BOW COUNTY.

During the past week Mr. W. S. Hutchinson has been putting his smoke-destroying apparatus in some of the calcining furnaces of the Parrot smelter, and on the 23d arrangements were completed for a trial. According to the Butte *Miner*, Mr. Hutchinson's appliance for destroying the fumes consists of a line of inch or inch and a half piping, one end of which connects with the boilers, while the other end leads to the fire-box side of the furnace, where six holes have been made through the wall near the top. Through these holes small jets of steam are forced, and a strong draught across the fire-box arch and over the burning concentrates is the result. Then, it is claimed, the steam mingling with the sulphur fumes accomplishes the combustion of the latter and carries them through the stack to the air where the residue evaporates.

It will take several days yet to demonstrate the practicability of Mr. Hutchinson's device, but the Parrot people, who have closely watched the experiment, are confident that success will crown his efforts. The different reports that reach us are most complimentary to Mr. Hutchinson, and speak most hopefully of the future abatement of this nuisance. Butte is indeed to be congratulated if these reports are verified.

ANACONDA MINING COMPANY.—The following certificate of incorporation of this company has recently been filed for record with the county clerk in Butte: We, the undersigned, William C. Gulliver and Allan McCullough, of New York City, and William W. Green, of Englewood, N. J., all citizens of the United States, do hereby, pursuant to and in comformity with the statutes of the State of Montana, relating to corporations for industrial and productive purposes, associate ourselves together and form a body corporate and to that end we do certify as follows:

First—The name of said corporation shall be "The Anaconda Mining Company."

Second—The objects for which said company is formed are to carry on manufacturing, mining, mechanical, chemical and mercantile business; the milling, reducing, refining and treating of ores and minerals; to acquire, buy, sell, convey, lease, improve, mine, work and develop mines and mineral lands containing gold, silver, copper, lead, tin, cinnabar, iron, coal and metals and minerals of any description whatever; to construct, own, operate, buy, sell, lease and use smelting, reduction and refining works and mills for the treatment and reduction of ores and minerals; to purchase, hold, develop, improve, lease, use, sell, convey, or otherwise dispose of water powers and the sites thereof and land necessary or useful therefor or for the industries and habitations arising or growing up or to arise or grow up in connection with or about the same; to construct and operate ditches, canals, dams and other means of conveying and utilizing water for irrigation, power, transportation and other useful purposes; to purchase, hold, lay out, plat, develop, lease, sell, deal in, convey or otherwise use or dispose of town sites or towns or the lots, blocks, or subdivisions thereof, or lots, blocks, or subdivisions in any town, village, or city; to construct, own, operate, buy or sell roads, tramways and other means of conveyance and transportation; to buy, sell, exchange and deal in all kinds of merchandise, personal property and real estate, and to carry on any other business or do any other thing in connection with the objects above mentioned that may be necessary or proper to successfully accomplish or promote said objects.

And said corporation for the purpose of raising money necessary for the transaction of its business or the acquisition of property shall have power to execute bonds, debentures, promissory notes or other evidences of indebtedness and to secure the same by a mortgage or pledge of all or any part of the property of the company, real or personal.

Third—The amount of the capital stock of said company shall be $12,500,000.

Fourth—The number of shares shall be 500,000 of the par value of $25 each.

Fifth—The term of existence of said corporation shall be 20 years and such further period as may be authorized by law.

Sixth—The number of trustees of said corporation is five, and the names of those who shall manage the concerns of said corporation for the first three months and until their successors are chosen are Jacob H. Schiff, August Belmont, Moses Kirkpatrick, William H. Dixon and Francis E. Sargeant.

Seventh—The operations of said company are to be carried on and it is to have its principal office for the transaction of business at Butte City, Silber Bow County, State of Montana; and a portion of the business of the company may be carried on without the State at such place or places as the company's business may require.

In witness whereof we have hereunto signed our names this 14th day of January, 1891.

[Signed] WILLIAM C. GULLIVER,
ALLAN MCCULLOH,
WILLIAM W. GREEN.

Signatures were acknowledged on January 14th, 1891, before Rudolf Dam, a notary public in and for Kings County, N. Y. Speculation is rife as to this change in the affairs of the company, but nothing beyond conjecture is heard with reference to the transfer.

MONITOR.—Rumor has it that high-grade copper ore is being taken from this claim, south of the Harris-Lloyd. So far the vein from which the ore is being taken is not large. Two have been discovered in the claim, both of which are close together and carry good ore. The shaft will be continued until a depth of 400 feet is attained. This claim is located lower than most of the producers of the vicinity. Continued good results will probably encourage more persistent prospecting in that neighborhood.

NEVADA.

(From our Special Correspondent.)

ELKO COUNTY.

The following bullion returns for the year 1890 havebeen made from some of the Tuscarora group of mines:

BELLE ISLE MINING COMPANY.—There was worked 985 tons of ore, which produced $22,023.01.

DEL MONTE MINING COMPANY.—There was worked 372 tons of ore, which produced $5 375.41.

NORTH BELLE ISLE MINING COMPANY.—There was worked 638·963 tons of ore, which produced $101,549.27.

NORTH COMMONWEALTH MINING COMPANY.—There was 918·147 tons of ore worked, which produced $166,216.14.

NAVAJO MINING COMPANY.—Bullion was produced as follows:

	Gold.	Silver.	Total.
Bars, 20 to 30-inch	$19,643.91	$13,751.52	$32,394.53
249 tons ore, counted as silver	.....	4,738.90	4,738.90
Concentrates, 701 tons	.....	2,677.62	2,677.62
	$12,643.01	$27,168.04	$39,811.05

(From our Special Correspondent.)

STOREY COUNTY—COMSTOCK LODE.

SAN FRANCISCO, Jan. 22.

For some time past the question of cheapening the expenses of working Comstock ore has been agitated, and if report speaks truly, is in a fair way to be consummated. For some months past a rebate has been given for milling certain grades of ore, but now it is contemplated to reduce the rate of royalty paid to the Comstock Tunnel Company, and with reduced rates for transportation and milling ores permit the working of the large reserves of ore contained in several of the mines which it has been hitherto impossible to handle at a profit.

CROWN POINT MINING COMPANY.—The pumping operations are steadily progressing. The vertical distance from the 1,500 level to the surface of the water was, at the beginning of the week, 84 feet, the water having been lowered nine feet during the previous six days. It is estimated that the pumps are raising fully 1,000,000 gallons of water to the Sutro tunnel level daily. When the 1,700 level is reached a stationary Dow pump, to be run by steam, will be placed in position. Below that level sinking will be continued by means of compressed air until the 2,200 level is reached, when another stationary pump will be placed in position and driven by steam power.

SAVAGE MINING COMPANY.—The suit alluded to last week as about to be instituted by M. W. Fox against this corporation has been begun, the complaint having been filed in the Superior Court on Monday. In addition to the particulars given a week ago the plaintiff prefers charges of fraudulent conspiracy on the part of H. M. Levy, A. K. P. Harmon, M. Hoeflech, H. Zadig and E. B Holmes, directors of the company, and of combination with the lessees of the Rock Point mill, where the Savage ore is crushed and milled. It is charged that the directors have paid the mill the exorbitant price of $7 per ton for milling, knowing that $3.50 was a fair and reasonable price for the work and knowing that some mills are compelled to use steam power generated from coal costing $9 per ton, which charge but $4 per ton for milling, while the Rock Point mill uses water power, costing from $1 to $2 per ton less to crush and mill ores than by steam power. The prayer of the complaint is that the defendants be enjoined from extracting ores from the Savage mining ground and from permitting the tailings and residues milled at the Rock Point mill being worked over, and compelling defendants to take and hold all such tailings and ores extracted until further order of the court; also, for an order compelling defendants to permit plaintiff and an expert selected by him to examine said mine and tailings at any and all

times demanded by him. It will be perceived that the sting of the complaint lies in the tail end, and if Mr. Fox wins his case he will not only benefit the other shareholders in the Savage Company, but will do a service to all interested in the honest and economical management of Comstock mines. For further information concerning the Comstock mill rings, see former numbers of the ENGINEERING AND MINING JOURNAL.

SIERRA NEVADA MINING COMPANY.—The annual meeting of the company was held yesterday, there being a very large percentage of the stock represented. Several changes were made in the Board of Trustees, the following being elected to serve during the ensuing year: C. H. Fish, president; C. Hirshfeld, vice-president; Herman Zadic, A. K. P. Harmon and R. R. Crayson. E. L. Parker was reappointed secretary and A. J. McDonell was appointed superintendent at the mine. The financial report of the secretary showed that the company had an overdraft at the Nevada Bank of $3,842.86. The work done in the mine during the past year failed to reveal any ore deposit of value, and the outlook, according to the report of the superintendent, was not very promising.

During the week ended Saturday, the 17th inst., the following amount of Comstock ore was milled

	Tons.	Assay Value.
Con., Cal. and Virginia	1,380	$13.10
Choliar	527	22.16
Justice	179	22.23
Overman	363	*13.96
Savage	547	16.00
Yellow Jacket	240	13.00

* Car sample.

NORTH CAROLINA.

DAVIDSON COUNTY.

(From our Special Correspondent.)

INDIAN HILL.—This property, which is an extension of the old Silver Hill, is now being developed on a small scale. The mine has been opened by three shafts, from 25 to 60 feet in depth, and considerable rich ore worked out from them, above water level, which is 35 feet from the surface. Below this the ore carries galena, pyrite and blende. The vein is three feet in width. A 1,600-pound sample of the ore was recently shipped to the North Carolina Smelting Works at Thomasville, and assayed $13.78 per ton in gold and $2.38 in silver; total, $16.16. If the exploration work now undertaken in the property is successful, machinery will be erected and the mine worked on a moderate scale.

MECKLENBURG COUNTY.

(From our Special Correspondent.)

BALTIMORE & NORTH CAROLINA.—Capt. William Lewis reports that he has struck better ore in this mine, and is now able to run five stamps and a concentrator regularly. He saves about 2,500 tons of concentrates per week, shipping them to the North Carolina Smelting Company at Thomasville. The concentrates assay from $50 to $60 per ton. Milling was commenced at the beginning of the year.

OHIO.

Negotiations are said to have been about concluded by which the Standard Oil Company will acquire all the property of C. C. Harris, one of the largest individual producers in the Northwestern Ohio oil fields. Wells are being gauged and the titles and leases are being signed. The amount of the sale it is estimated will reach about $1,750,000.

HATTA MINING COMPANY.—The hoist on this property has just been completed and the shaft straightened so that sinking can be continued. The shaft is down 320 feet. Ore taken from the 270-foot level, in stoping, assayed from $80 to $160, and stoping is now to be commenced on the 300-foot level. There are ten men employed in the mine. Mr. Holland, the superintendent, estimates that there are five to six tons of low grade ore on the dump that will average $29.

NORTH STAR AND SALISBURY MINING COMPANY.—A two-foot vein of 50-ounce ore is reported to have been struck in the south cross-cut from the 150-foot level. This property is owned by a company, of which Marcus Daly, James A. Murray, Dr. C. F. Mussigbrod and George Tong are the heaviest shareholders, and up to a few months ago nearly $10,000 had been spent in an endeavor to find ore in paying quantities. After sinking the shaft 250 feet the property was abandoned. Mr. Daly found the water good enough for use at the Anaconda mines and started the pumps at his own expense. A few weeks later the water had been lowered to such an extent that work could be conveniently prosecuted in the south 150-foot cross-cut. Believing that a body of good ore existed somewhere close to the shaft, several members of the company started prospecting anew with results as given above.

FRANKLIN COUNTY.

News reaches us from Columbus that the natural gas companies have recently refused to supply private consumers after citizens had gone to the heavy expense of putting in the necessary fixtures in their residences and business houses. Cards were sent to all consumers asking if they would agree to an increase of 15 cents per thousand. The Council was asked to permit a charge of 25 cents per thousand for the next two years, and finally it was claimed that the pressure had so far decreased as to render it necessary to turn off the gas. The Board of Public Works has authorized an expert to examine the wells and mains with a view of officially learning the facts, as it is believed that an abundance of gas would follow the increase in price. The city attorney was also requested to report if the company, having failed to carry out its contracts, had not forfeited its charter. Representative Schuler, of Crawford County, claims to be in possession of information which leads him to believe that a natural-gas trust has been formed in Ohio and the present controversy is merely to serve as a test case. If successful in securing the consent of the Council to advance prices other cities are to fare in a similar manner. The introduction of a bill in the Legislature to regulate city councils and prevent any deal in this direction is spoken of.

The coal operators who gathered at Columbus, on the 28th inst. to consider the demands of the miners made at their meeting recently, decided the demands could not be granted.

OREGON.

MARION COUNTY.

A few days ago a man named Miller, who has a farm in the vicinity of Hubbard, near Salem, noticed oil in the water in marshy places on his farm. It is now reported that Vancouver capitalists are preparing to develop the find, and recently succeeded in negotiating a lease of a good many acres in that neighborhood. An incorporated company, with a capital stock of $300,000, has been formed. The duration of the leases is said to be 30 years, a certain percentage of the output of oil being part of the consideration. Mr. Shaw, of Vancouver and a member of the Washington legislature, is one of the principal movers in the company, which agrees to subscribe for four-fifths of the stock if the remainder is taken by Hubbard people.

PENNSYLVANIA.

COAL.

[*By Telegraph.*]

Jan. 28.

H. C. FRICK COKE COMPANY.—There was an explosion of gas in the Mammoth mine belonging to this company yesterday, which resulted in the loss of 130 lives. The cause of the explosion is still unknown. The mine has been hitherto free from gas, and no safety lamps were used. It was inspected on the 16th inst. and its condition marked "fair." The work of recovering the bodies is now in progress, and many have been buried. A relief fund for the families of the dead miners has been started in Pittsburg. The output of the Mammoth mine was about 60 cars per day. The mine is uninjured and work will be resumed when the debris is removed.

OIL.

A meeting of independent oil refiners and producers was held in Oil City last week. C. B. Mathews, of Buffalo, presided. The following officers were elected for 1891: President, John Teagle, Cleveland; vice-president, C. D. Ramage, Reno, Pa.; secretary, C. D. Chamberlain, Ohio; treasurer, D. E. Byles, Oil City; executive, transportation and financial committees were appointed, and a resolution urging Congress to pass an amendment to the Interstate Commerce law to give all fines and penalties for violations to the informant was passed. A resolution was also adopted in favor of corporation with the Farmers' Alliance and all other organizations in favor of government supervision or ownership of railways.

It is reported that S. W. Harley, the well-known oil operator, has sold his lease of 33 acres on the Whitesell farm for $16,000 to J. A. Waterhouse and L. N. Hooker, of Fredonia, N. Y. The farm near Wildwood is located in the extreme northeastern part of the field and within a few rods of the Bowman gaser. Rigs are now going up on the lease.

UTAH.

SUMMIT COUNTY.

DALY MINING COMPANY.—The new shaft is down about 75 feet, and work is being pushed. The grading for the new hoisting works, which will be built over the present temporary building, is completed. The boilers are in position and the foundation for the engine laid. The machinery is being overhauled at the Ontario shops, and is almost ready for use.

TOOELE COUNTY.

CALUMET & MUSCATINE MINING COMPANY.—This company is prospecting its property at Stockton by means of diamond drills. It is intended to prospect the ground as thoroughly as possible by drilling ten or twelve holes to a depth of 250 to 450 feet each. The drills used are 1¾ inches in diameter, and have a core $1\frac{1}{16}$ inches. So far four holes have been bored to depths varying ofrm 175 to 375 feet.

VIRGINIA.

(From our Special Correspondent.)

BUCKINGHAM COUNTY.

THE ROSNEY IRON AND LUMBER COMPANY, LIMITED.—This company has been incorporated for the purpose of building a new town to be known as Rosney, in Buckingham County. Its officers are: F. T. Shaw, of Westminster, Md., president; Dr. J. H. Billingslea, vice-president, and H. M. White, of Washington, D. C., secretary. The capital stock is $1,000,000; a Bessemer iron furnace and steel plant, a 100-ton charcoal furnace, acid works and other industries are already projected. Inducements will be offered to any companies contemplating the erection of manufactories.

WASHINGTON.

STEVENS COUNTY.

CAPITAL.—This iron mine was formerly owned by a Mr. Alexander, who located it in the Spring of 1890. At the time of transfer, a few months ago, to Messrs. Davis and Day, of Valley Station, and W. R. Rust, of the Tacoma Smelting and Reduction Company, development work consisted of a 25-foot incline, from which probably 40 tons of ore had been taken. Since the transfer the lead has been tapped at a point 300 feet south. The ledge is continuous and is traceable for 4,500 feet. The vein of limonite is from 7 to 12 feet in thickness, and is said to carry an average of about 60% iron excess, from 15% to 20% lime, a small percentage each of manganese and phosphorus, and is valuable for fluxing purposes as well as for the manufacture of a fine quality of pig iron. From the upper workings of the mine there is an overchute 156 feet in length to convey the ore from the bin to the wagon road below. It is the intention of the company to ship from 10 to 20 tons of ore per day over the Spokane Falls & Northern.

Messrs. Day and Davis have leased Mr. Rust's interests in the mine, and have contracted to furnish 1,000 tons of ore for fluxing purposes to the Tacoma Smelting and Refining Company.

WISCONSIN.

GOGEBIC RANGE.

IRON.

(From our Special Correspondent.)

HURLEY, Jan. 26.

PENCE MINING COMPANY.—A fine deposit of hard blue Bessemer ore has been discovered on the west end of this company's property. The extent of the new find will probably be known in a few weeks. This lens was opened up in the new shaft, 380 feet from the surface, and the only cross-cut so far driven, shows 16 feet of ore, and is still in ore. This is one of the finest showings made in the Wisconsin end of the range.

JACKSON COUNTY.

ALLEN MINING COMPANY.—News reaches us from Black River Falls that this company has contracted to deliver 1,000 tons of iron ore to the York Iron Company's furnace. According to the terms of the agreement, the company will pay $2.90 per ton, delivered at their furnace, on all ore that assays 58 per cent. iron and not more than 20 per cent. silica. Ore that will assay 59 per cent. will bring $3 per ton; 60 per cent., $3.10, and so on. Gogebic ore delivered at the furnace is said to cost $4.06 a ton, but the ore taken from that range assays about 65 per cent. The ore from the Allen mines which are located is a brown hematite. This shipment, if satisfactory, will mark the beginning of a change in mining circles in that vicinity about six miles east of Black River Falls, and active operations on a large scale will be immediately commenced.

WYOMING.

CROOK COUNTY.

(From our Special Correspondent.)

DEADWOOD, D. T., Jan. 22.

BLACK HILLS, WYOMING & CHICAGO COAL COMPANY.—The annual meeting of this company was held in Deadwood on the 21st inst., and the following officers were elected: F. M. Barret, president; A. Fox, vice-president; John R. Wilson, treasurer; C. M. Harding, secretary. The properties of this company are located on Hay Creek, Crook County, close to the South Dakota line, and only about 40 miles from Deadwood. The properties have a fine vein of bituminous coal of excellent quality. It is from 4 to 6 feet in thickness, lying under a strong, hard sand-stone capping. The claims are all contiguous. Their development was commenced in 1876 or 1877, but the greater portion of the work has been done within the past three years. Upon the completion of the railroad now building, and only about 15 miles distant, mining will be begun on an extensive scale. The coal is said to be fully equal, if not superior, to the New Castle coal, and has proved very satisfactory by numerous tests. It has been in domestic use in this vicinity for a number of years.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

The province of Alberta, on the east foot of the Rocky Mountains in British Columbia, promises enormous mineral wealth, according to the preliminary report of Mr. W. S. Drury, of the Dominion Topographical Survey. In this region anthracite coal is reported in seams 20 to 50 feet thick; copper ore 28% fine, silver, lead and gold have been discovered. Evidence also goes to show that petroleum fields underlie the plains of Alberta, and natural gas is there already utilized in a limited degree.

GERMANY.

According to an official notification, the farmer Heinrich Dethmann, in Meldorf, Holstein, has received the permission to work a deposit of lignite

covering 2,128,800 square meters in the district of Kuden.

MEXICO.

Twenty German miners from New York and fifteen Americans from Alabama arrived recently at Honco, Mexico, where they have been engaged to work in the coal pits of the Alamo and Coahuila companies. The excellent coal and coke produced by these companies, says *El Minero Mexicano*, are in constantly increasing demand throughout northern Mexico, and the only difficulty is to secure a sufficient force of labor.

JALISCO.

LA LUZ.—The La Luz silver mines, owned by a London company, are situated in the Hostotipaquillo district. Mr. H. A. Hilton, the new manager, has lately telegraphed to the company that large ore bodies have been discovered in the San Miguel mine and that he advises the erection of a mill to treat this ore. There is, however, a plant already at the mine and some supplementary machinery on the way, and it is believed that no farther expense will be incurred until some positive results are seen. Mr. James Pill has been recently appointed consulting engineer and will advise with the manager as to the best methods that should be adopted to extract and economically treat the ore. The ore at the San Miguel mine is reported to assay 75 ounces of silver and nearly half an ounce of gold per ton.

DIVIDENDS.

Atlantic Mining Company, dividend No. 14 of $1 per share, $40,000, payable February 16th at the office of the company, No. 76 Wall Street, New York City. Transfer books close February 6th and reopen February 17.

Colorado Coal and Iron Company, coupon No. 22, due February 1st, on the bonds of this company will be paid on February 2d at the office of the company, No. 15 Broad street, New York City.

Granite Mountain Mining Company, dividend No. 73, of 50 cents per share, $200,000, payable February 10th, at the office of the company, Laclede Building, St. Louis, Mo.

Little Rule Mining Company, dividend No. 11, of 2 cents per share, $10,000, payable January 29th at the office of the company, No. 1624 Curtis Street, Denver, Colo.

Sloss Iron and Steel Company coupons, due February 1st on the first mortgage bonds of this company, will be paid on and after February 2d at the office of the Central Trust Company of New York, New York City.

Tennessee Coal, Iron and Railroad Company, coupons due February 1st on the "South Pittsburg" bonds of this company will be paid on and after February 2d at the Fourth National Bank, New York City.

The Bi-Metallic Mining Company of Montana has declared its monthly dividend of 35c. per share. Total dividends declared to date, $340,000.

MEETINGS.

Bates-Hunter Mining Company, at the office of Morrison & Kohn, Clayton Block, Denver, Colo., February 10th, at 4 P. M.

May-Mazeppa Consolidated Mining and Milling Company, at Room 7, News Block, Denver, Colo., February 27th, at 4 P. M.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Adelaide Cop., Nev.	2	Dec. 27	Jan. 31	Feb. 18	.06
Alliance, Utah.....	11	Jan. 5	Feb. 7	Mar. 2	.10
Brunswick, Con., Cal	1	Jan. 8	Feb. 10	Mar. 6	.02
Con. Imperial, Nev..	30	Dec. 13	Jan. 13	Feb. 9	.05
Del Monte, Cal.....	4	Jan. 5	Feb. 9	Mar. 3	.20
Exchequer, Nev.....	30	Dec. 11	Jan. 15	Feb. 5	.25
Hale & Nor., Nev....	97	Jan. 7	Feb. 11	Mar. 4	.50
Head Center Con., Ariz.....	5	Dec. 12	Jan. 15	Feb. 6	.03
Iron Hill, S. Dak.....	19	Jan. 9	Feb. 11	Feb. 28	.03
Kentuck, Nev.....	..	Dec. 29	Feb. 3	Feb. 25	.35
Locomotive, Nev....	..	Dec. 1	Jan. 22	Feb 10	.05
Lone Star Con. Cal.	2	Dec. 29	Feb. 7	Mar. 2	.00½
N. Gould & Curry, Nev.....	12	Jan. 10	Feb. 11	Feb. 28	.20
Potosi, Nev.....	35	Dec. 16	Jan. 20	Feb. 10	.50
Riverside, Cal	1	Dec. 11	Jan. 12	Feb. 2	.10
Sierra Nev., Nev	98	Jan. 2	Feb. 5	Feb. 24	.30
Utah Con., Nev.....	11	Dec. 9	Jan. 19	Feb 9	.25

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, Salt Lake City, San Francisco, Baltimore, Denver, Kansas City, Minneapolis, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 159 and 160.

NEW YORK, Friday Evening, Jan. 30.

The stock market presents a condition for this week's report similar to that which we have been called upon to chronicle from time to time during the past three months. The sales for the week aggregate 37,550 shares, as against 38,937 shares for the week preceding. Of this number the dividend-paying stocks sold to the number of 10,055 shares. The market during the past week has been speculative in its tendency, to a greater degree than in weeks past. The tendency of holders to realize on small lots of stock has been one of the features in the week's transactions. It is the general belief that this is through a desire to obtain a little money rather than through any fear that the market will go much lower. The tradings during the week were chiefly in Comstocks, the prices, as a rule, holding their own fairly well and in some cases showing quite a marked advance. Of the other stocks there is no marked change to report.

The Augusta Mining and Investment Company has made application for listing its shares at the Consolidated Stock and Petroleum Exchange. In the statement accompanying the application the following facts are set forth: The company was incorporated April 12th, 1890, for the purpose of buying, leasing, holding, developing, improving and disposing of real estate and other property. The authorized capital is $2,500,000 in 100,000 shares of $25 each.

The actual capital is $1,250,000, in 50,000 shares of $25 each, full paid and non-assessable. There is in the treasury $92,000 in stock and $58,000 in bonds. The principal office is at Staunton, Va. The transfer office 160 Broadway, Geo. A. Post, secretary. The certificates are registered by the Manhattan Trust Company. The officers of the corporation are C. A. Avery, president and treasurer; John Paulson, vice president; G. A. Post, secretary. Directors: Alex. Matland, Andrew S. Upson, Frank Fitch, Nat. D. Moore, Nat. Hibbert, C. A. Avery and John Paulson. This company is organized for the purpose of doing business and not for speculation. The ENGINEERING AND MINING JOURNAL is in possession of full data concerning the extent of its property, the development of the same, etc., etc., which it will give its readers at an early date.

Of the Comstocks, Consolidated California & Virginia is to be credited with sales of 500 shares in two lots, at $4, an advance of 10 cents over last week's closing price. Crown Point opened at $1.80, the closing price of last week, and rose to $1.90 on Thursday on light sales. Gould & Curry lost 10 cents during the week on one sale, which occurred on Wednesday, at $2.50. Ophir sold during the week at $3.25, an advance of 25 cents over last week's price. Savage experienced one sale at $2.25, a drop of five cents. Sierra Nevada made a marked climb; 100 shares were called out on Friday at $2 20, an increase of 40c. over last week's closing price. Yellow Jacket opened the week on Monday at $2.30, a drop of 20c., rising to $2.35 on Wednesday, and closing to-day at $2.60 on very moderate sales. Alta was quite active during the week, opening at 70c., declining on Tuesday to 65c., and closing strong to-day at 80c. Best & Belcher opened and closed the week at $2.65, a drop of 5c. below the closing price of last week. Chollar ruled during the week at $2.20 on light sales. This is a loss of 30c. Comstock Tunnel surprised its holders on Thursday by selling at 16c., a gain of 1c. over the price which has ruled for several weeks; 3,500 shares were traded in. Mexican opened the week at $2.40, a drop of 30c., rose steadily on light sales, with closing price at $2.75. Occidental ruled steady at 80c., a rise of 10c. over last week's closing price. Potosi was traded in to the extent of 100 shares, quotations being made at $5. Scorpion sold 200 shares at 35c., and Seg. Belcher 100 shares at $1.40. Union Consolidated experienced one sale on Friday, at $2 35, a gain of 55c. over the closing price on the 22d. Utah opened the week at 83c. on moderate sales, dropped and closed at 85c., last week's price.

Of the Tuscaroras North Belle Isle opened at 50c., declined and closing at 40c., a loss of 5c.; the sales were very moderate.

There was quite a little activity in the Amadors stocks this week. Amador opened at 6c. on Monday declining on the same day to 4c. with sales of 800 shares. Astoria alternated between 4c. and 5c. during the greater part of the week, closing at the latter figure on Thursday on sales of 4,400 shares. Belmont was steady during the week at 31c. It is quite evident that those most interested in this stock have made up their mind that this price is not to be cut; 1,800 shares changed hands. Middle Bar enjoyed its customary activity. It opened at 5c. rose to 8c. on Tuesday, declining to and closing at 4c. on Thursday; 5,700 shares changed hands.

The Bodie stocks, comparatively speaking, were quite active. Bodie Consolidated ruled at 95c., a gain of 5c. over last week's quotations. Bulwer experienced one sale of 200 shares at 25c., last week's ruling price. Standard opened the week at $1.45, a decline of 35c., and closed at $1.40.

Brunswick opened the week at 10c., a gain of 2c. over last week's ruling price, at which figure it closed on Tuesday. Sales amounted to 3,500 shares.

Plymouth Consolidated sold at $2 on Monday, at which price it ruled until Friday, when it rose to and closed at $2.50 on sales of 720 shares. It is said that this increase was caused by the reported improvement of the nature of the company's deposit.

Of the Colorado stocks, Phœnix Lead enjoyed one sale on Tuesday of 100 shares at 13c. Dunkin was in the market for the first time in several weeks; 100 shares sold at 65c. Freeland opened at 18c., but declined to 13c. on the same day; it advanced and closed at 18c.; on Friday the sales amounted to 3,400 shares. Little Chief sold at 35 and 34c., the latter being the closing price.

The copper stocks were in the market to a limited extent. Quotations were all lower than those last week. Atlantic sold 50 shares at $14.13 as against $15.38; Calumet & Hecla sold 25 shares at $247.50 and $250 63, a decline of about $1 over last week's quotations. Franklin sold 40 shares at $16.25 as against $17.13; Kearsarge was in the market to the extent of $11.38. Osceola sold 20 shares at $45.50, Tamarack 20 at $146.13. Boston & Montana sold on Saturday at $41.25, on Thursday at $39.50; 70 shares changed hands.

Homestake was quoted to-day for the first time in some weeks; 30 shares changed hands at $9. Caledonia ruled at 55c., last week's closing price. Deadwood sold 100 shares at 75c. on Monday.

Horn Silver had not yet recovered from the spasmodic state in which it was thrown on last Thursday. It opened on Monday at $2.85, rose and closed to-day at $3, the ruling price before the bears got in their work. The stock was brought out in a small lot to the extent of 1,250 shares.

Silver King sold 200 shares at 20c.

Silver Mining and Smelting of New Mexico sold 350 shares at $1.50.

El Cristo opened the week at 52c., declining to and closing at 50c. on very light sales.

Kingston & Pembroke appeared in the market on Saturday; 500 shares changed hands at 50c.

Phœnix of Arizona ruled steady during the week at 64c., the ruling price of last week.

Boston. Jan. 29.

(From our Special Correspondent.)

The market for copper shares continues dull and inactive, with a slightly downward tendency, although prices have not materially changed. There is very little disposition at present to speculate and transactions are confined largely to the dividend paying list, or those likely to become so in the near future. Santa Fe is perhaps an exception to this rule, as the reports from that mine indicate an improvement in its prospects. There has been a good buying demand for the stock, which has carried it up from 47½c. to 62½c., at which price it seems to find ready sale.

Calumet & Hecla sold in small lots at $250, the same price as last week.

Boston & Montana sold this week at $39 dividend off, but has more than recovered the dividend, and sold to-day at $40.50. Quincy sold up to $105 and reacted to $100, with later sales at $104.

The sale of the Pewabic mine to parties favoring the interests of the Quincy is doubtless the cause of the advance. Tamarack declined to $140, but recovered and sold to-day at $145. Osceola advanced from $34 to $35 on moderate sales, selling at the latter price to-day. Franklin declined from $16¾ to $16. There is no doubt some dissatisfaction among stockholders at the failure of the committee to purchase the Pewabic property, which has caused some selling of the stock, hence the decline. Time will prove the wisdom of their action in the premises. Atlantic declined from $15 to $14. A dividend of $1 per share was declared at the meeting of the directors yesterday, being the same amount as paid in August last. There was a little firmer feeling on Butte and Boston, which advanced from $14⅝ to $15. Centennial has ruled very dull and declined from $16 to $15¼, with later recovery to $15¾. Kearsarge has been neglected during the past week, and on very small sales advanced from $10¾ to $11⅝. Allouez is very firm at $2. All the stock offered at that price is taken and a sale of 200 shares to-day brought one-sixteenth better. National has been heavy, declining from $3½ to $3. Huron sold at $3¼. Bonanza sold up to 60c. to-day, a gain of 10c. per share. Lake Superior rights sold at $4 and $5. Silver Stocks—The reported rich find in the Catalpa mine has created quite a demand for the stock, which advanced in price from 30c. to 42½c. Crescent, its near neighbor, sold at 15c. Dunkin dull, with sales at 65c. Breece declined to 35c. 3 P. M.—Since the noon hour the market has improved both in activity and prices. Boston & Montana advanced to $41¾, on sales of about 500 shares, closing at $41¼. Atlantic sold up to $15, Franklin to $17, and Osceola to $36. Quincy sold at $105, but closed at $103. The tone of the whole list was decidedly better.

By Telegraph.—Tamarack, $145; Franklin, $17½; Osceola, $36; Centennial, $16½; Boston & Montana, $41½; Kearsarge, $12½; National, $3; Atlantic, $16.

St. Louis. Jan. 28.

(From our Special Correspondent.)

St. Louis has a better showing this week. Many stocks were traded, which for some time have been dead on the market. Granite Mountain and Bimetallic were both active. At the beginning of the week 26 shares of Granite Mountain sold for $43.50. A day later 10 shares sold for $42, and toward the end of the week over a hundred shares were sold at $42.50. Total amount of sales for the week was 251 shares. Market closed strong at $42.50. The regular shipment of the mine amounted to 45 bars, containing 59,850 ounces of silver and 110 ounces of gold.

Bimetallic opened at $33 and closed at $34; 60 shares sold.

A new stock to be listed was that of the Four Mile Mining and Milling Company. The mine is situated in Boulder County, Colo., and produces

gold, silver and lead. The capital amounts to $300.000; 100,000 shares in the treasury and with 200,000 shares outstanding.

It started out well on call with a bid of 25c Total number of shares sold this week, 3,500. Present quotation on stock, 23¾c.

A reorganization of the Gold King Mining Company was effected this week. The company was reorganized as the Gold King Consolidated, with a capital of $3,000,000. The officers of the new company are: James Campbell, president; J. G. Kelly, secretary; Jos. Gameau, C. Nunn, George Leighton, and J. G. Chapman, directors. The stockholders in the old company will be allowed to exchange their old stock for an equal amount in the new company. All stockholders will be obliged to pay an assessment of 60c. per share. The company still holds a 12 months' lease on the property. With the reorganization the stock advanced 10c. on call, and with an opening of 10c. is now quoted at 20c. At the first of the week it was as low as 9c., and just after the reorganization was quoted as high as 22½c. Sales, 11,000 shares.

President Culver, of the Mickey Breen, has returned from his London trip. As yet the English capitalists have not bought the mine. The option has been extended to March 1st, 1891. They made a bid on the property, but it was altogether too low. This news has but small effect on the stock and it is still quoted at 85c. At one time it was as high as 92½c., but did not stay there long. 3,400 shares were sold this week.

Twelve thousand nine hundred shares of Central Silver were sold this week, though the stock, in common with the rest, declined several points. Opening at 10c., it rose to 12c., but by this date is bid at 7½c.

Hope was little traded in, though the stock managed to go up 20c., and is now quoted at $2.15. The officers for the year 1891 are: J. C. Porter, president; Luther H Conn, vice-president; G. A. Angst, treasurer; Chas. Cuno, secretary; August Shepleigh, J. C. Block, L. H. Conn, Wilbur F. Beale, and H. B. Louderman, executive committee.

Elizabeth opened at $2.35 and advanced to $2.60, but has since suffered a reaction of 2½c.; 7,200 shares changed hands during the week. It was reported that a strike had been made, and it was much on this account that the stock had a boom, several sales being made at $2.67½, seller 30 days, but the report was not confirmed.

Tourtelotte, a stock which has been neglected for some time, was revived and sold at 02c. Sales amounted to 12,600 shares.

Montrose had a sale of 800 shares. The market opened at 60c., fell to 55c. and closed at 56½c.

Silver Age fell off 10c. during the week, and is now bid at $1.50. Only a slight demand for the stock; total sales, 500 shares.

Yuma had a call this week, and was in fair demand, 2,200 shares being sold. Present price, 50c., 2½c. below the opening rate and 3¾c. below the highest quotation.

Three stocks to have a bid this week, the first in a very long while, were La Union, Richmond Hill and Silver Bell. The former sold at 01c.@01½c. and 1,200 shares were disposed of. 100 shares of Richmond Hill changed hands on a very firm market of 60c.

Four hundred shares of Silver Bell brought 15c.

Sales of Little Albert amounted to 600 shares, selling at 20@25c., the market closing at 21¼c.

Mountain Key sold a hundred shares this week at 42½c. The market opened at 40c. and during the week advanced 3¾c.

Adams was very dull and had no sales. Opening at $1.50, the stock advanced to $1.75, but fell again to $1.67½.

San Francisco. Jan. 22.

(From our Special Correspondent.)

The inflation of the Comstock mining stocks which was a distinguishing feature of the market during the first part of the month, shaded off last week and during the current week has given way to still lower prices. One week ago the dealings in the Board amounted to over 33,000 shares, while yesterday the total sales amounted to only 7,745 shares, the latter, too, being sold at prices much below those ruling when the market was active. This sudden drop in prices is not owing to any unfavorable news from the mines, the outlook being quite encouraging, but rather to the withdrawal of the large operators who have again abandoned the market to the tender mercies of the "chippers." As it is the habitual custom of these small dealers, and indeed the street generally, to go short on the market, it is very probable that the report that prices are to go still lower will prove correct; and when the chipper and curb-stone brokers are congratulating themselves on the outlook, prices will bound upward in response to the manipulations of the big operators and the old story of the shorts being cornered will be repeated. It is quite possible that this may take place sooner than expected. The magnates of the Comstock have been in conference together, and any course of action they may have determined upon will have an influence upon the market. This morning trading was inactive, only 3,000 shares being sold, and Consolidated California & Virginia was quoted at the old time low price of $3.70. For some days the action of Gould & Curry has been peculiar. The fluctuations have been wider, while the sales have been by no means larger than any other stock, and this morning sold steady at $2.50 when most of the other Comstocks gave evidence of further weakness.

Denver.

Prices and sales for week ending Jan. 24th, 1891:

Company.	Opening.	H.	L.	Closing.	Sales.
Alleghany, Colo	16a	*12½b	10b	10½	.....
Amity, Colo	01¼	02	01¼	01¾	1,000
Bangkok, C. B., Colo	05	06	05	05½	10,000
Bates-Hunter, Colo	56b	58	58	60	12,700
Brownlow, Colo	05b	05	05	05	700
Calliope, Colo	24b	*25	24	23	1,000
Cash, Colo	10b	10b	10b	10	.....
Clay County, Colo	90b	94b	80	80	2,300
Hard Money, Colo	....	....	....	....	.....
Leavenworth	49a	25	16½	17¾	700
Little Rule, Colo	100a	100a	94b	....	.....
Matchless, Colo	250b	250b	100b	250b	.....
May-Mazeppa, Colo	113b	123	112	123	2,300
Mollie Gibson, Colo	....	....	....	....	.....
Oro, Colo	.....	100b	50b	100b	.....
Pay Rock, Colo	03¼b	04	03¼	04	13,600
Puzzler, Colo	....	....	....	....	.....
Reed-National, Colo	....	70a	50b	51	.....
Running Lode	26b	*23½	22	21¾	4,600
Silver Cord, Colo	20b	23b	20b	23	.....
Whale, Colo	....	....	....	....	.....
Bal. Smuggler Prospects.	95b	95b	35b	35	.....
Argonaut, Colo	....	15b	10b	15	.....
Aspen United, Colo	....	01½	01¼	....	1,600
Big Indian, Colo	12a	12a	12a	....	.....
Big Six, Colo	06¼b	†06½	‡05¾	§06	24,800
Century, Colo	25b	20	20	15	200
Claudia J. Colo	....	....	....	....	.....
Nat. G. & Oil Co	07	09	09	‡05½	4,700
Diamond B., Colo	01½b	01¼	01¼	01½	3,400
Emmons, Colo	40	*42	39½	39½	2,200
Golden Treasure, Colo	....	15	15	15	100
Ironclad, Colo	....	02	01¾	01¾	100
John Jay, Colo	03	03¾	02¾	02¾	2,500
Justice	11b	12½	12	12½	1,200
Legal Tender, Colo	01¾b	02	02	02	300
Morning Glim, Colo	45b	48	41	45	900
Park Consolidated	19b	19	19	19	200
Potosi, Colo	04½b	05	04½	04¾	1,000
Rialto, Colo	60a	60a	60a	40	.....
Total					92,700

* Buyer 30. † Buyer 60. a Asked. ‡ Seller 60. b Bid. § Seller 30.

PIPE LINE CERTIFICATES.

(Specially reported by Messrs. WATSON & GIBSON.)

The petroleum market this week has been devoid of interest and color. The Standard Oil Trust appear to be doing absolutely nothing, except to maintain their position of absolute control over the production, transportation and refining of oil, and the public are, as usual, holding entirely aloof.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales
Jan. 24	....	....	....	....	.....
26	....	....	....	....	.....
27	73⅜	7 9⅝	73⅜	73⅜	5,000
28	....	....	....	....	.....
29	....	....	....	....	.....
30	74	74	74	74	5,000
Total sales in barrels					10,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Jan. 24	75¾	75⅞	75⅝	75⅝	12,000
26	75½	75½	75½	75½	21,000
27	75¼	75¼	74½	75⅛	67 000
28	75	75	75	75	12,000
29	75	75	74⅞	74⅞	11,000
30	74½	76½	73⅜	75⅛	77,000
Total sales in barrels					201,00

COAL TRADE REVIEW.

NEW YORK, Friday Evening, January 30.

STATEMENT of shipments of anthracite coal (approximated) for the ten days ending January 24th, 1891, compared with corresponding period last year:

Regions.	Jan. 24, 1891.	Jan. 25, 1890.	Difference.
Wyoming Region. Tons	367,749	253,031 Inc.	114,718
Lehigh Region "	113,592	98,846 Inc.	14,746
Schuylkill Region "	203,498	148,052 Inc.	55,446
Total Tons	684,839	499,929 Inc.	184,910
Total for year to date Tons	2,425,343	1,901,795 Inc.	513,548

PRODUCTION OF BITUMINOUS COAL for week ending January 24th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1891. Week.	1891. Year.	1890. Year.
Phila. & Erie R.R	4,367	11,772	10,614
Cumberland, Md	†83,235	207,660	209,038
Barclay, Pa	*2,631	10,387	6,585
Broad Top, Pa	13,444	39,250	41,285
Clearfield, Pa	85,588	328,228	313,461
Allegheny, Pa	26,102	87,745	80,763
Beach Creek, Pa	*42,283	174,727	101,945
Pocahontas Flat Top	44,571	135,430	130,597
Kanawha, W. Va	*24,872	48,873	137,759
Total	327,093	1,044,072	1,122,047

* Estimated
† Week ending January 17th.

WESTERN SHIPMENTS.

Pittsburg, Pa	23,171	91,484	66,693
Westmoreland, Pa	45,809	142,612	126,481
Monongahela, Pa	14,286	48,333	18,866
Total	83,266	282,429	212,040
Grand Total	410,359	1,326,501	1,334,087

PRODUCTION OF COKE on line of Pennsylvania R. R for the week ending January 24th, 1891, and year from January 1st, in tons of 2,000 lbs.: Week, 105,411 tons; year, 331,065 tons; to corresponding date in 1890—402,140.

Anthracite.

The present situation of the anthracite coal trade, to use plain English, is a serious one. The causes which have led to this state of affairs are only those which might be expected to follow a disregard of the laws of supply and demand. For several months past certain of the operators, keeping but vaguely in mind the fact that there was a fixed output beyond which they ought not to go, have step by step exceeded the tonnage allotted to them, and have marketed the same in a way that has tended to demoralize the market. These monthly limits, as a general rule, are regarded by the companies as guide posts rather than barriers of action. During the fall, with its winter market, and the winter with its cold weather, all concerned were willing not to question a slight excess on the part of an operator. However, as the sun's rays approached the vertical, and the days began to become warmer and lengthen, the market became dull. The sales agents, in order to meet conditions which experience has taught them prevail at this time of year, fixed the tonnage for the month of January at 2,500,000 tons. Producers were earnestly requested to keep their outputs within this limit, and it was thought that the trade would be harmoniously maintained. Early in the month, however, it became apparent that some of the producers were going beyond their allotted tonnage. When on Saturday, the 24th inst., it was learned that the output had reached 2,400,000 tons, or within 100,000 tons of the amount allotted for the entire month, it was decided by the far sighted and experienced operators that stringent corrective measures must be taken in order to avert what seemed to be imminent disaster. The question has been thoroughly agitated in coal circles during the past week, and has given rise to a feeling in the trade which can in no sense be considered harmonious. It culminated on Thursday at a meeting held for the purpose of considering the situation. The companies were all represented.

The decision reached was in effect that the output must be fixed at a figure compatible with the demand, and that this figure must be strictly adhered to in order to avert a serious condition of the trade. In consideration of the fact previously stated, namely, that the January output was more than likely to surpass the limit prescribed, it was decided to fix one figure for the January and February outputs. This was placed at 5,000,000 tons for the two months. And in addition, to pledge themselves not to sell below present prices. As the output for January, at the rate maintained so far during the month, will approximate 3,000,000 tons, the February tonnage must be restricted to 2,000,000 tons under the terms of this agreement. It is understood upon good authority that this agreement was considered by some few representatives as rather strong medicine, and that they would not bind their companies by a ratification of the same until a consultation had been held—thereby virtually declining for the time to ratify the decison of the meeting. For the purpose of affording all an opportunity to avail themselves of the agreement, by a concurrence, it was decided that should any of these doubtful ones desire, on sober thought, to hold out against its terms, they should signify their intention within a short time. This will place upon record all elements of the trade, and each operator must be for the combine or against it—a most business-like way of disposing of the matter.

The future of the wholesale trade is now in the hands of these operators. It can be but one of two things, either federation—a rigid adherence to scheduled rates and outputs—or of an unlimited output and ruinous prices, in the wake of which must follow, in time, general demoralization. The market is dull in the East and in the West. Coal has been shipped greatly in excess of the demand. All avenues of the trade have been filled, and they must be cleared before there will be a call for more coal. The warm weather is near at hand and it is several months before the '91 winter's supplies will be sought.

It would seem that in the face of these conditions so pronounced and all of which must be apparent to every operator in the trade, that there could not be an element of discord which would assert itself. The history of the wholesale coal trade has been a checkered one, and its managers have been taught by a rather costly experience that federation is necessary for success. The situation resolves itself into this: It has been demonstrated on more than one occasion that any of the mines can double their present output. There is hardly a market at present prices for the present tonnage. This large reserve capacity has been a constant menace to the trade. To-day it is like a sword suspended by the traditional hair, it may fall at any time and with slight provocation. If four

or five of a half dozen operators wish to protect themselves by curtailing their output, and the others throw their surplus on the market, the majority are not going to combine against the minority, for the reason that the latter's resources will prohibit such action of their part. They are simply to do the most natural thing under the circumstances, namely, to meet them with their own weapons. Cutting and slashing would become the rule rather than the exception, and the market would then be the buyers. With these facts so plainly before them, facts which will permit of no misinterpretation, it would be injust to suppose that any factor of the trade will be so blind as to court disaster by fusing to conform with the counsels of the majority. The wholesale coal trade is now in the hands of men of large experience, who have been through many a situation like the one threatened. It is to be hoped and it is believed that all will look at the matter with unprejudiced eyes and that the first of March will mark a harmonious condition of the trade.

There is being made by independent operators more or less of an effort to bring about a readjustment of railroad freight rates on anthracite. So far as can be learned there is no concentrated action, each individual working along independent lines. The most decided move in this direction that is of recent origin is the complaint against the Delaware. Lackawanna & Western Railroad Company, which Haddock, Shonk & Co. have lodged before the Interstate Commerce Commission. The complaint, although unlike any others which has been made to that body, is not without precedent. The readers of the ENGINEERING AND MINING JOURNAL will recall to mind the action brought by Coxe Bros. & Co. against the Lehigh Valley Railroad Company, in which the plaintiff sought to compel the defendant to haul anthracite at the same rate as it does bituminous—the case although tried has not been decided, also the complaint which John C. Haddock, a member of the firm which constitutes the plaintiff in the case in question, in which he sought to obtain a readjustment of rates in coal going West. The present action is brought to compel the defendant to extend to the plaintiff the same shipping rate as it itself enjoys as a coal company. Said complaint alleges that the defendant owns and operates numerous mines, not only for its own consumption, but for the purpose of making a merchantile profit on the sale of the product thereof, and in doing so makes a discrimination in its own favor against all private shippers over its lines; that the published rate of tariff of the defendant is $1.80 per ton of 2,240 pounds on anthracite shipped to Hoboken and delivered free on board vessels, and $2.50 per ton on anthracite coal shipped to Buffalo, whether consigned to Buffalo or delivered there free on board vessels; that the rates of competing roads hauling coal to Buffalo under the same conditions are from 25 and 50 cents a ton less than those charged by the defendant; that the rates to Hoboken are excessive, discriminating, prohibitive, unreasonable and unjust; that the defendant discriminates in favor of bituminous coal by charging a much higher rate on anthracite, thereby forcing the market of the latter to so high a figure that its use is prohibited except for purposes for which bituminous coal is not fitted. The case is not brought as a "bluff," and will be pushed to an issue. The trade will watch its progress with no little interest.

The matter of a combination between the railroad coal companies and the independent operators, by which the former will market the product of the latter, is still receiving considerable discussion. It is now assuming such shape that we can say that there is no probability of anything like a complete combination being formed this year. The matter will probably result in a certain few of the operators selling their products to the companies.

In the face of the facts above stated, it would be hard to prophecy concerning spring prices. If the combination holds together, and it is thought that it will, the spring prices will doubtless be be fixed at the meeting which will be held February 12th, to go into effect March 1st.

It is rather difficult to obtain current prices, owing to the unsettled element which has been figuring quite prominently in the market during the week. These given below are those generally followed: F.o.b. store, $4; egg, $3.75; broken, $3.55; chestnut, $3.65. Smaller sizes are still in the best demand. We quote buckwheat, $2@$2.10; Lehigh, $1.75@$2; pea, $3; Lehigh $2.75@$3.

Bituminous.

The market for bituminous coal may be said to be a little easier than it has been at any time during the month. Natural and favorable conditions seem to be bringing about this much desired result, and the large operators claim that during the month of February all the coal needed is likely to be supplied at fair prices. Last week fancy prices were offered with no takers; this week the practice has been to ask fancy prices; these offers have met with very few takers. The greater bulk of the stock which is moving is still going to fill contracts. The strike in the Clearfield and the Mountain districts has been averted for the time at least A board of arbitration consisting of a representative for each district and one for the miners was appointed to decide the matter. Upon the recommendation made by this board the miners concluded to postpone action until March 3. It is prophesied by leading men of the trade that a further postponement will be made until June 1st—the time when most of the present contracts expire. At that date the miners will obtain a concession giving them 8 hours' labor.

Affairs in the Connellsville district are beginning to assume an ominous aspect. At a convention of the men held last week it was decided to notify the operators that they must meet the men by February 2d for the purpose of a conference; that in default of such meeting a strike which will involve the whole region and affect 12,000 men will be declared to go into operation on February 10th. The operators declare the demands of the men to be ridiculous, while the men take an opposite stand, equally determined. One of the most certain signs that a strike is imminent is the action of the large coke consumers who are now stacking several months' supplies of the fuel at their respective works. Notable among these are the Edgar Thomson Steel Works of Carnegie Bros. & Co., at Braddock, Pa. Smaller operators are following suit. This laying in a several months' supply of fuel, which must be paid for at the end of the month it is ordered, and the transportation rates of which must be met at the time it is delivered, thus involving an enormous expense, shows how seriously those who are in touch with the coke market regard the situation. A strike in the Connellsville region, of any extent and duration, would nearly double the price of coke.

The formation of the Seaboard Association has been stopped pending the determination of freight rates, which are to be fixed on March 1st. Well informed men seem to think that these rates will be reduced, basing their belief upon the fact that coal moving by way of Norfolk and Baltimore is coming in as cheap as Pennsylvania. Those who hold the opposite view base their belief upon the scarcity of coal during the last three months, caused by the difficulty of getting it to tide-water.

The Grand Trunk Railroad is now in the market for 700,000 tons of Philadelphia coal. It is authoritatively stated that the operators will stand together in the matter of supplying this amount, and that the rate will be 25 cents a tons higher than it was under last year's contract. Prices, which are quoted, are the same as those which were given last week, as follows: At Baltimore, $2.85 f. o. b.; at Philadelphia, $2.95; at New York, $3.30, and alongside, $3.50.

NOTES OF THE WEEK.

The Altoona & Wapsononock Railroad, now being constructed from Altoona to the Wapsononock hotel, will be extended a few miles beyond the last named point, in order to develop soft coal territory. Connections will be made with the Pennsylvania road at Altoona.

The members of the bar of Blair County, Pa., have unanimously signed a petition asking Judge Dean to again become a candidate for the office of county judge, his term having about expired.

It is reported that a company is being formed for the purpose of constructing an electric line from Dawson, on the Yough River, to Juniata, about three miles west of Connellsville. It will run through Liberty, Adelaide, Bradford and intermediate points. Mr. James Cochran and Colonel Hill are said to be back of the enterprise.

The legitimate retail dealers of Brooklyn have suffered considerable of late because of the practice of certain of their unprincipled confrères of giving short weights. At a meeting of the Brooklyn Retail Exchange held recently the following resolution was unanimously adopted:

"That the board of trustees be and is hereby authorized to purchase appurtenances, engage an inspector of weights and measures and adopt methods for the testing of scales and the weighing of coal in the city of Brooklyn and the counties of Kings and Queens, in accordance with the plan proposed by the executive committee, March 4th, 1889." The trustees appointed Mr. Wm. Weeks, formerly of the firm of Losee & Bunker, as official weigher. The members subscribed a fund sufficient to meet the expenses of the office for the first year.

The Consolidated Coal Company, of St. Louis, yesterday sued its agent, Stephen W. Gilman, of Chicago, for $50,000. Gilman is charged with extensive frauds in connection with sales to Overman & Co., the Chicago, St. Paul & Kansas City Railroad and the Wisconsin Central Company.

The recent decision of the Supreme Court of Illinois against the Consolidated Coal Company, in which it was decreed that coal seams are liable to taxation notwithstanding the fact that the property is paying a surface tax, is of much interest to the trade. A full account of the case will be found in our mining news columns.

The Reading Railroad Company it is announced, has been dissatisfied for some time past with the slow way in which the Reading's coal traffic between Bound Brook and Perth Amboy and Port Liberty, has been handled by the Central Railroad of New Jersey. The matter was referred to in President McLeod's annual report of recent date. Yesterday arrangements were completed by which the Lehigh Valley Railroad will handle the business for the Reading until the Reading's new branch from Bound Brook to Port Reading on the Arthur Kill is completed.

The following comes from Baltimore: There is a shortage in the supply of steamer coal here, due to the fact that the Baltimore & Ohio railroad has not enough cars to haul the coal from the mines. Schooners have been waiting for coal cargoes for weeks. They have been to Norfolk, Newport News and Philadelphia, but those cities are in as bad a shape as Baltimore.

The Pennsylvania Railroad reports the total tonnage of anthracite passing over the united railroads of New Jersey for year ending Dec. 31 1890, 1,697,258 tons, a decrease of 50,922 tons compared with 1889.

Chicago. Jan. 28.

(From our Special Correspondent.)

The condition of the anthracite market has not materially changed during the past week. Business is limited to current requirements, with a light demand from the country. The outlook at this center is not reassuring. Owing to the long-continued mild weather and the lateness of the season, the movement of a tonnage greater than that required for immediate needs cannot now be looked for. Present trade, although far from being satisfactory, is reported better than it was last year at this season. Prices remain easy.

Wholesale prices are f.o.b. Chicago: Large egg, $5.50; small egg, range and chestnut, $5.75; Lehigh lump, $7.

The retail prices fixed by the Chicago Coal Exchange are: Large egg $6.75, small egg, range and chestnut, $7.

For bituminous coal the demand is light and prices unsteady, except for screenings, which are in good request, owing to the decreased output of coal and the large number of automatic stokers now in operation. Quotations per ton of 2,000 pounds are: Erie, $4.25; Pittsburg, $3.40; Indiana block, $2.50; Blossburg, $3.90; Greene and Sullivan County (Ind.) shaft, $2.25@$2.40; Jackson Hill, $3.35; Jackson shaft, $3.35; Hocking Valley, $3.20; Youghiogheny, $3.40.

For coke the demand is light, and a dull market is reported from all directions without any prospect of improvement in the near future. It is reported that 12,000 coke burners in the Connellsville region are now preparing for a prolonged strike to be inaugurated on February 10th. Quotations are: Connellsville, 72 hours, $5.05; domestic, crushed, $4@$4.25; Elk Lick, 72 hours, $4.25@$4.50 per ton of 2,000 pounds f. o. b. Chicago.

Buffalo. Jan 29.

(From our Special Correspondent.

There is nothing new this week. Anthracite is fairly active and bituminous in good request, with a firm market. Some dealers in anthracite complain that the output thus far this year is altogether too large for the trade requirements, and would like to see it curtailed. A coal dock superintendent at West Superior is reported as saying that, "even under favorable circumstances from this time on until spring, there will be at least one-third of the hard-coal supply left on the docks."

The soft coal required by the Grand Trunk Railroad, as mentioned last week, will aggregate 735,240 net tons, to be delivered as follows: At Portland, 32,000 tons gross; at Montreal, 80,000 tons gross; at Chandieres, 40,000 tons gross; at Brockville, 45,000 tons net; at Point Edward, 35,000 tons net; at Detroit, 25,000 tons net, and at Suspension and International bridges, 460,000 tons net.

The Philadelphia & Reading Company will in the future manage its own coal shipments here, Mr. J. J. Albright having retired from the coal business, except so far as his membership with Messrs. Albright & Smith is concerned.

Messrs. Brinker & Jones, of this city, have purchased Mr. E. L. Hedstrom's interest in the Shawmut Coal Company. The property covers 6,000 acres of land in Edgar, Elk Co., Pa., where, it is estimated, 90,000,000 tons of coal are waiting to be mined.

Messrs. Albright & Co., who for many years have handled the business of the Philadelphia & Reading Coal and Iron Company in this city, have sold out nearly all their interests in Buffalo to the railroad company. The sale comprises Albright & Co.'s immense storage plant at Checktowaga as well as their interest in the Central Dock and Terminal Railroad Company, whose extensive docks and coal trestles are located at the foot of Georgia Street, and some property connected therewith. The total value is $450,000. The storage plant at Checktowaga consists of an iron building covering nearly seven acres, with capacity for 350,000 tons. The coal trestle at Georgia street cost over half a million dollars. Mr. J. J. Albright was offered the management of all this property, but declined, as his other interests demanded his attention, and he requires rest. Mr. Albright will continue to reside in Buffalo.

The Delaware & Hudson Canal Company has commenced removing rock and other obstructions on the water frontage to its docking facilities in this city, which will enable vessels drawing 17 feet of water to reach the docks. The work is to be completed by August 1st. The company thus provides for vessels of 350 feet in length and 50 feet beam, which will be able to wind around at the point where the docks, etc., are situated in Buffalo River near the Ohio Basin.

A river-side and canal-frontage site has been purchased in this city, at Black Rock, easily accessible by boats and railroads, for unknown parties. It has leaked out, however, that a large smelting establishment will occupy the ground. Some wise men say that the Calumet & Hecla Mining Company is the backer of the scheme.

Coal stealing from cars is a flourishing industry in this city at present. Several persons were fined $5 each last week for peculation.

Colonel Horton, of the Lehigh Valley Company, says that "the season is pretty hard on coal men. There has been cold weather enough to enable the ice man to get in a good supply, but too mild in Buffalo to help the coal trade. What we fellows want is a month or two of steady, far-below-zero weather."

Boston.

Jan. 29.

(From our Special Correspondent.)

The anthracite coal market continues to move in a monotonous way. The demand is comparatively light, and consists of an occasional order from some dealer who wishes to piece out his stock. The weather continues stormy and cold, and certainly favors a continuance of the large consumption which has been going on for some time. This fact gives the agent an air of confidence which in itself is almost indicative of the appearance of a good demand. The general verdict among this class is that the spring will be an active one. They reason everything favors a large demand in the near future, and it must come. The offerings continue large, and stocks at tidewater are reported to be specially large.

The position of bituminous coal continues unchanged. The scarcity of stock continues, but this fact is not essentially felt as the demand is small. The market tone rules firm and the prices are held up at the top notch. As yet none of the large contracts has been given out. Gas coal continues to hold about the same position as noted last week. Most of the consumers have fair supplies and only a small demand prevails.

Freight rates continue quiet and steady. Vessels are plentiful, but at times it is difficult to get suitable sizes. From New York 75@85c. is quoted; from Baltimore $1@$1.15; and from Philadelphia $1.15@$1.25; at the last port several charters have been reported at as high as $1.50.

The retail demand continues satisfactory. Dealers are slowly but surely decreasing their large stock, and the coal at tidewater here is at present much less than it has been for some time. Prices are ruling fairly steady and cutting has abated considerably.

The receipts of coal at this port for the week ending January 25th were 11,379 tons of anthracite and 25,683 tons of bituminous, against 14,739 tons of anthracite and 18,824 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 70,549 tons of anthracite and 57,158 tons of bituminous, against 68,245 tons of anthracite and 50,555 tons of bituminous for the same time last year.

Pittsburg.

Jan. 29.

(From our Special Correspondent.

Coal.—The market remains quiet all along the line. The strike inaugurated January 1st along the Monongahela Valley continues, with both sides as firm as ever. Coal shipped by the Ohio River, January, 1890, was 11,631,000 bushels, which, at three cents per bushel for mining, amounts to $348,930, and the miners are out about that amount this month. The coal men say that at the present price coal at 3½ cents for mining is out of the question. Prices of coal at Pittsburg, wholesale, f.o.b., are $4.50@$5.00 per 100 bushels. Railroad coke, $5.00@$5.50.

Connellsville Coke.—The trade has been active for the reason that a strike is looked upon as almost certain on February 10th. Furnaces are piling up coke at all accessible points to be ready for any emergency. Carnegie & Co. have sufficient coke stored to last for several months. Other firms are doing likewise. The number of idle ovens in the region exceeds 6,000. This will be largely increased in the near future. Shipments last week increased over 600 cars; Western increased 189 cars and Eastern gained 495 cars. Shipments to various points west of Pittsburg were 2,285 cars; east of Pittsburg, 1,803; Pittsburg and River points, 1,795 cars; active cars, estimated, 10,010; shipments aggregate 95,094 tons.

Price of coke:

New rates.		Founders	2.20
Furnace	$1.90	Crushed, dealers	2.50
Dealers	2.15	Crushed, consumers	2.65

Freights are unchanged to all points.

A letter has been received from a Dunbar miner who thinks the cokers have asked too much in their demand for a new scale, and declares he himself would be satisfied if the eight-hour day is granted, equal to an advance, he claims, of 10 per cent. in wages. The miner advocates concessions on both sides rather than force a strike involving 40,000 people, including miners' families.

FREIGHTS.

From Philadelphia to: Boston, .95@1.35; Charleston, 1.35; Galveston, 2.25; New Bedford, .75.; Newburyport, .95@1.00; New Orleans, 2.25; Portsmouth, 1.35; Providence, .75; Salem, 95@1.00; Savannah, 1.50; Washington, † .85.

† Alongside.

METAL MARKET.

NEW YORK, Friday Evening, Jan. 30.

Prices of silver per ounce troy.

Jan.	Sterling Exch'ge.	Lond'n Pence.	N. Y Cts.	Jan.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.
24	4.87	47 9-16	1.03½	28	4.87½	47¾	1.03¾
26	4.87	47⅝	1.03⅝	29	4.87	47½	1 03⅝
27	4.87½	47¾	1.04	30	4.86¾	46⅞	1.02

Council Bills declined $\frac{1}{32}$ this week, and have been increased 5 lacs for next week.

The market during the first of the week held steady on London buying for shipment, but upon these orders being filled and no speculative demand, silver closes weak. In fact, the market broke badly on account of haste of speculators selling out, owing to disbelief in any silver legislation this session of Congress.

The United States Assay Office at New York reports total receipts of silver for the week to be 125,000 ounces.

Silver Bullion Certificates.

NEW YORK STOCK EXCHANGE.

	Price. H.	Price. L.	Sales.
Jan. 24	103⅞	103⅝	120,000
Jan. 26	104	103⅝	70,000
Jan. 27	104⅞	104¼	460,000
Jan. 28	104⅝	103⅞	187,000
Jan. 29	103⅞	103¾	80,000
Jan. 30	103	101½	260,000
Total sales			1,177,000

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars	$ .80	$ .82
Mexican dollars	.80	.82
Peruvian soles and Chilian pesos	.73	.75
English silver	4.80	4.84
Five francs	.94	.95
Victoria sovereigns	4.85	4.88
Twenty francs	3.84	3.88
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.80	4.85
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00
Bar silver	1.03	1.04

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting on Thursday lowered its minimum rate of discount from 3½ to 3%. In the week the bank gained £317,000 bullion, and the proportion of reserve to liabilities was raised from 43·91% to 45·56%, against an advance from 39·91% to 43.12% in the corresponding week last year, when its discount rate was 6%. On the 29th inst. the bank lost £38,000 bullion on balance.

Copper—Copper remains stagnant, but no pressure to put copper of any description on the market is noticeable. Lake is obtainable at 14½c., and we understand that some contracts were made for delivery over the next two months thereat. The large buyers are not in the market but continue their policy of reserve. Arizona copper is held very firmly and is well supported. No pig copper is obtainable below 11¾@12c., and no Arizona ingot copper below 13¾@14¾c., but casting copper is irregular at 11¾@12c. The heavy shipments for export continue and advices received from the other side report further sales of Montana matte at 10s.

The London market had been very firm at £53 5s.@£53 7s. 6d. for spot until the 29th, when prices receded to £52 15s. and to-day they are closing at £52 12s. 6d.@£52 15s. for spot and £52 17s. 6d.@£53 for three months. We quote: English tough, £55 10s.@£56; best selected, £58 10s.@£59; strong sheets, £65@£65 10s.; India sheets, £59@£60; yellow metal sheets, 5⅞d.

The exports of copper during the past week were as follows:

To Honolulu—	Copper.	Lbs.	
By Ship Centennial	10 casks.	12,500	$1,825
To Liverpool—	Copper matte.		
By S. S. Celtic	2,243 bags.	244,332	17,060
By S. S. Connemara	2,529 bags.	292,723	24,500
By S. S. Runic	4,147 bags.	443,871	30,000
To Liverpool—	Copper.		
By S. S. Nevada	75 casks.	44,800	5,824
By S. S. Lydian Monarch	36 cases.	45,000	6,350
To Havre—			
By S. S. La Bourgogne.	342 pigs.	119,100	14,000
" "	742 bars.	100,315	15,000
" "	135 casks.	165,750	25,312
To Rotterdam—			
By S. S. Obdam	462 pigs.	112,008	14,600

Tin.—Tin has somewhat been dragging, but if the transactions are not large the consuming business continues on quite a satisfactory scale. Prices are evidently considered cheap by manufacturers, and the deliveries continue to be very good. Sales have been made for April-May delivery at $20.25@$20.35, and the closing quotations are: Spot, $20.15; February, $20.15; March, $20.20; April, $20.25.

In London the market is somewhat lower. Prices opened at £91 5s., but came down to £90 7s. 6d.@£90 10s., for spot, and £90 15s@£90 17s. 6d., for three months, with a fair business doing.

Lead.—A stronger tone prevails, but the business has been very limited. Very little is offered for shipment from the West and such orders as present themselves cannot be filled except at very full prices. We quote 4·40 buyers, 4·45 sellers.

The foreign market is dull. English lead is quoted at 12·15 and Spanish at 12·10.

St. Louis Lead Market.—Messrs. John Wahl & Co., telegraph us as follows: "Market steady. Sales of a retail character at 4.10c.; offerings are light and the demand appears to be limited."

Official information from the St. Louis & San Francisco Railway Company shows that there were 20 tons of lead received at St. Louis for the week ending January 23d.

Chicago Lead Market.—Messrs. Everett & Post telegraph us as follows: Consumers have been very apathetic during the week and actual business has been almost at a standstill. Desilverized lead was offered at 4·15c. without takers, but chemical has been held firmer; closing quotations are 4·15c. for desilverized; 4·20c. for chemical.

Spelter.—We have again to chronicle lower prices. Some of the largest smelters in the West have been anxious sellers during the last few weeks, and the galvanizing trade being bad at this time of the year, consumers abstained, and thus a very large and unforeseen drop in prices has occurred. The market is so irregular that it is difficult to give exact prices, and we have to quote 5·35–·45.

The London market is steady at £23 7s. 6d. for ordinary and £23 12s. 6d. for specials.

Antimony is in much better request and spot is comparatively scarce. We quote: Cookson's 19½c.@20c.; L. X., 17¼c.@17½c.; Hallet's 16½c.@16¾c.

Quicksilver.—Nothing worthy of record has occurred in this market; some small sales have been reported, although the tenor of the market is far from active. We quote prices abroad, £8 12s. 6d. Here within $48@$50.

IRON MARKET REVIEW

NEW YORK, Friday Evening, Jan. 30.

The only term that can be applied to express the condition of the iron market during the past week is that it has been irregular. Some dealers report business in the same dull status which has prevailed for so long, while others report considerable improvement. On the whole the general feeling seems to be slightly better than it was last week. The demand for pig iron is apparently normal for the time, and dealers are making somewhat increased sales. Consumers who have been holding off in expectation that prices would go still lower have undoubtedly realized that that is not at all likely, even under present conditions, and as a consequence are again buying in usual quantity. Notwithstanding the improvement in the tone of the market, however, no dealers express any hope of a rise in prices. The stock of pig iron, as shown by the statistics of the Iron and Steel Association, is sufficient to prevent any such movement as this for a while, at least, with the present rate of consumption. There has been a very considerable decrease in production, however, since the first of the year, which is undoubtedly strengthening the market. Without there being any prospects of another boom, there seems to be no reason to expect any falling off in the demand for iron, and even at present prices the year should be a prosperous one.

American Pig Iron.—There seems to be a slightly better demand for pig iron, and many small dealers are reporting a fair business. The same number of furnaces continue out of blast in the Mahoning and Shenango valleys, but from the Birmingham district it is reported that a few of the furnaces which have been idle since the commencement of the miners' strike, have blown in again. None of the Southern furnaces are offering strictly No. 1 foundry iron at present. Prices remain unchanged, and we quote: Northern iron, No. 1x, $17.50@$18; No. 2x, $16.50@$17; Southern, No. 2x, $15.50@$16.50.

Scotch Pig Iron.—The market is in the same condition which we reported last week, very little business being done. There have been no arrivals during the week. We quote as last week: Dalmellington, $22.50@$23; Eglinton, $20.50@$21; Carnbroe, $21.

Spiegeleisen and Ferro-manganese.—Business continues very dull, with nothing but small lots changing hands. Small lots of ferro-manganese have been sold on the coast as low as $61@$62, but these prices could not probably be duplicated. We quote, nominally, for 20% spiegeleisen, $29; 80% ferro-manganese, $64@$65.

Steel Rails.—There has been but little demand for steel rails during the past week. The effects of the late financial depression are still felt by the railway companies, and they are apparently holding off also to determine the strength of the agreement between the rolling mills. The price asked by all sellers is $30, but it is probable that this

figure might be shaded a trifle upon a desirable lot for cash.

Rail Fastenings.—Business is still dull, although there have been somewhat larger transactions during the week. A New England railway company purchased a round lot of fastenings, including 31,000 pair of angle plates at $1.75, delivered. The price of spikes has fallen off to 2·00c. on 100-keg lots. We quote: Spikes, 2·00c.; angle plates, 1·70@1·80c.; bolts and square nuts, 2·75c.; hexagonal nuts, 3·00c.; complete joint, iron and steel, according to weight.

Tubes and Pipe.—Business continues very good for this season of the year and is steadily improving. We quote discounts on carload lots as follows: 47½% on butt, black; 40% on galvanized; 60% on lap, black; 47½% on lap, galvanized; boiler tubes: 50% on all sizes; casing, all sizes, 50%.

Structural Iron and Steel.—The market has been dull. The course of business has been rather upset during the week by the assignment of Cheney & Hewlett, who have been among the largest dealers of iron for building purposes. There has been no change in prices, and we quote: Universal plates, $2.20; bridge plates, $2.15; angles, $2.20; beams, $3.10.

Merchant Steel.—Business is very good and orders are coming along quite freely. Prices, however, are neither firmer nor weaker than last week. We quote: Best English tool, 15c., net; American tool steel, 7@8c.; special grades, 13@20c.; crucible machinery steel 5c.; crucible spring, 3¾c.; open-hearth machinery, 2·60c.; open-hearth spring, 2·60c.; tire steel, 2·60c.; toe calks, 2·60c.; flat file, 4½c.; mill file, 4½c.; taper file, 7c.; first quality sheet, 10c.; second quality sheet, 8c.

Old Rails.—The market is very quiet, with no transactions of importance to note. The price remains nominal at $23 for tees and $25 for doubles.

Wrought Iron Scrap.—The market is very quiet, and there are sales of nothing but small lots. We quote from $21@$22.

Chicago. Jan. 28.

(From our Special Correspondent.)

The iron and steel market is steadily improving; even the most conservative are looking forward to a year of great activity and better prices; orders are daily increasing, particularly for finished material. There is now going into consumption some 40,000 tons per week of crude material, and a continuance of this rate will soon reduce stocks at furnaces. Many consumers of pig iron are now in the market to secure the benefit of the present low rates. The tonnage now moving is much beyond that anticipated a month ago. The shut-down in the valleys has not as yet affected this market, and probably will not for some time to come. Local plants are in enforced idleness, chiefly on account of the unsettled condition of railway affairs, which has led to an almost complete cutting off of orders from that source, with much uncertainty as to the future—but when they do come in the market, as they will be obliged to do at no distant day—a considerably increased impetus will be given to the volume of business.

Pig Iron.—This market is only fairly active, and the general demand is perceptibly improving. Buyers have found at last that pig iron makers have a minimum below which they will not go; orders are being refused at very slight concessions asked on present rates. It is surprising that the wholesale restriction in the output does not check the downward course of prices, but no apparent effect is noticeable; stocks at furnaces are still very large, and until they are considerably decreased, no material strength can be looked for. Lake Superior irons are in fair request, as are also the soft grades of Southern iron.

We quote to-day for cash per ton of 2,240 pounds f. o. b. Chicago, for Nos. 1 and 2, Lake Superior charcoal No. 3, for car wheels, Nos. 4 and 5 for malleable, $18@$18 50; Lake Superior coke, Bessemer, $18.50; Lake Superior coke, Bay View No. 1, $15.50; No. 2, $15; No. 3, $14.50; Southern coke, No. 1, $16@$17; No. 2, $15.50@$16; No. 3, $14.25@$14.75; Southern charcoal, $19@$19.50; standard Southern car wheel, $22@$24.50; Ohio softeners, Hanging Rock, $18@$18.50; Jackson County, $18.25@$18.50; Hanging Rock, cold blast, $26@$28; warm blast, $23@$25; No. 1 Scotch, according to brands, $26@$27; American Scotch, $18.50@$19; Bay View Scotch No. 1. $18; No. 2, $17; Chicago Scotch, No. 1, $17; No. 2, $16; Emma Scotch, $18.50@$19; black band, Hubbard Scotch, $18.25; Hazelton, $18.50; Soft Silvery, $18; Wellston, No. 1, $18 75; No. 2, $18.25; Hamilton, No. 1, $19.25@$19.75; Norton, No. 1, $17.50@$18; Zanesville, No. 1, $18.75@$19.25.

Structural Iron.—There is a large amount of business in sight and every prospect for a large volume of trade. Much figuring is being done both on city and country work. At present small orders are sufficiently numerous to keep trade active. Prices are: For car lots f.o.b. Chicago, iron and steel angles, $2.35@$2.40; universal plates, $2.50; sheared plates, $2.50; tees, $2.85@$3; beams and channels, $3.20. Store prices are: Angles, $2 50@$2.60; tees, $2.90@$3, and beams and channels, $3.50@$3.70, according to quantity.

Bar Iron.—A better inquiry is reported for railway and merchant iron; the outlook from the mill standpoint is more encouraging and values are stronger. Local mills quote $1.65 for half extras, f.o.b. Chicago, and Valley mills $1.60 at mill, adding that orders for a large tonnage for future delivery would not be accepted at these figures. Dealers quote $1.90 rates, with extras for large lots from store.

Black Sheet Iron.—The present market is weak but the demand is growing better. Quotations are easy at $2.85 for No. 27 common at mill. Jobbers' price for same guage and quality is $3.30 with the usual advance for refined.

Galvanized Sheet Iron.—Mill orders are numerous, and business from store is quiet, but not unusually so for the season. Discounts remain unchanged at 62½% on Juniata, and 62½% and 5% off on charcoal from store.

Merchant Steel.—Inquiries are increasing in some directions, but it is claimed that inducements are being offered. Those maintaining prices find business light. The collapse of the American Harvester Trust is regarded by manufacturers as favorable to an increased consumption of stock and strengthening values. We quote as follows: Tool steel, $7.75@$8; specials, $12@$25; open-hearth machinery, $3; Bessemer machinery, $2.50@$2.70; open-hearth spring steel, $2.75@$2.80; tire, $2.50@$2.60; toe calk, $2.70@$2.80; sleigh shoe, $2.40@$2.50; cutter shoe (T. & B.), $2.65@$2.70; crucible sheet steel, $7@$10; crucible spring, $3.75.

Nails.—Steel cut nails are in fair demand at $1.85. Wire nails have been advanced 10 cents at mill on account of the advance in wire rods, but jobbers have not as yet changed their price, which is $2.30 for small lots from store.

Plates, Tubes, etc.—Rates are firmer, and manufacturers seem to be well supplied with work again. Dealers report a very encouraging business. Quotations are: Tank iron, $2.70; tank steel, $2.90; heavy sheets from 10 to 14, $2.90@$3; steel sheets 10 to 14, $3.25@$3.50; shell iron, $3@$3.25; flange iron, $4@$4.25; flange steel, $3.50; shell steel, $3.25; boiler rivets, $4@$4.25; firebox iron and steel, $4.75@$5.50; boiler tubes, 4½ inches and larger, 52½%; 2 to 4 inches, 50%, and 1¾ inches and smaller, 45%.

Steel Rails.—The demand for steel rails is improving; inquiries are more abundant, and the outlook for business is considerably brighter than it has been of late. Local mills are still standing idle, and it is not yet known when they will resume. Present business is confined to small lots for immediate requirements for the most part. Regular quotations for standard sections are made according to delivery. Prices are unchanged from $30@$31.50; car lots are selling at $32 f.o.b. Chicago.

Railway Track Supplies.—Demand continues limited to current needs, and prices are weak. We quote: Iron fish plates, $1.95@$2; steel fish plates, $2.10@$2.15; bolts, square nuts, $3; hexagonal nuts, $3.08@$3.10; spikes, $2.10@$2.15.

Scrap Iron.—The better grades of wrought scrap are in better request at firmer prices; other scrap is still very dull, but the tone of this market on the whole is more healthy, and dealers more cheerful.

We quote as follows: Country mixed scrap, $15.50@$16.50, according to condition; No. 1 mill, $14@$14.50; light wrought, $9@$9.50; horseshoes, $19@$19.50; axles, $25; cast machinery, $12; stove plates, $9.50@$10; borings, $8@$8.50; wrought turnings, $11.50; No. 1 railroad shop or forge, $20; track scrap, $19.

Old Wheels and Rails.—A small sale of old iron rails is reported at $22.75. Old steel rails continue very quiet at $13.50 for short lengths and $17.50 for long, suitable for rerailing. Old wheels are also very quiet at $17.

Cleveland. Jan 29.

(From our Special Correspondent.)

There has been during the past week no movement in iron ore. There has been no talk, either of new ore contracts or vessel contracts. The principal topic of conversation among iron-ore men has been the reputed sale to parties connected with the Chicago & Northwestern Railroad and the Vanderbilts, of the Schlesinger Syndicate's interests in the Chapin mine, the East Negaunee mines, viz., Buffalo, South Buffalo, Queen, Prince of Wales, and the new railroad which has been built from the Chapin mine to Escanaba

Quotations remain unchanged, and those of last week may be repeated:

Specular and Magnetic Ores.

Bessemer	66@69%	$3.00
"	64@64%	5.00@5 50
Non Bessemer	66@69%	5.00@5.50
" "	62@65%	4 50@5.00
" "	57@60%	3.75@4.25

Soft Hematites Dried at 212°.

Bessemer	62@65%	$4.75@5.25
"	58@61%	4.25@4.75
Non Bessemer	55@63%	3.50@4.25

Above prices are for deliveries on docks at Lake Erie ports.

Louisville. Jan. 24.

(Special Report by Hall Bros. & Co.)

About the only change of any consequence to note in the iron market for the past week has been an increase in inquiries for present and future delivery. Buyers appear to be satisfied, in a measure, with the present low ruling figures and willing to contract ahead, although some contemplated purchases have been deferred, ostensibly for the reason that the parties thought that better terms might be obtained by this procedure. On the whole, the general tone of the market appears better.

Hot Blast Foundry Irons.—Southern coke, No. 1, $14.25@$14.50; No. 2, $13.75@$14; No. 3, $13.25@$13.50. Southern charcoal, No. 1, $16.50@$17; No. 2, $16@$16.50. Missouri charcoal, No 1, $17.50@$18; No. 2, $17@$17.50.

Forge Irons.—Neutral coke, $12.50@$13; cold short, $12.50@$13; mottled, $12@$12.25.

Car Wheel and Malleable Irons.—Southern, standard brands, $21@$22: other brands, $17.50@$18. Lake Superior, $21.50@$22.50.

Philadelphia. Jan. 30.

(From our Special Correspondent.)

Pig Iron.—Large buying is reported this week in crude iron in city and in country offices. Salesmen making their circuits have sent in good foundry-iron orders. Large sales of forge have also been made. Nearly all this new business was done at low prices, and the poorer brands were chiefly dealt in. A good deal of No. 1 iron has been sold at $17.50, though $18 is asked for all first class brands. For No. 2 $16@$16.50 is bottom price, and a few large buyers have covered at these figures. The demand is not at all general. Buyers feel that things have not yet settled down, and despite the fact that there is very little room for lower prices, buyers cling to the notion that lower prices are bound to come. Most of this week's business in forge iron has been done at $14.50.

Foreign Material.—Spiegel is offered at $23.50@$30.50, and ferro manganese is $61.50. No business.

Muck Bars.—Several buyers have offered $26.50.

Steel Billets.—Billets could be bought at $28.50. From all that can be gathered large concerns have as much material contracted for as they want at present.

Merchant Iron.—The possibility of a reduction in cost of making iron keeps large buyers out of the market, and makes all buying of a very retail character. Good bars were sold at 1·70, but 1·80 is the general price.

Skelp.—Manufacturers say that prices are lower than for a year, and parties who two months ago could not get enough material now do not want any. This is a rather strong way of saying the market is dull and prices $1.75@$1.85.

Wrought Iron Pipe.—Discount on butt welded black and lap welded galvanized, 47½.

Sheet Iron.—Sales of best refined were made this week at a sharp cut from card rates. Business is backward, but the mill men think they will have a good winter's demand.

Plate and Tank.—Some shading has been done on small orders this week of an unusual character, which emphasizes the fact that there is great anxiety among manufacturers to secure business. Ship plates and tank are 2c., but more favorable figures are privately quoted.

Structural Iron.—Large buyers are very stubborn in their negotiations for material for the coming season, and refuse to talk about placing long running contracts at anything like present quotations on angles, plates and tees. One or two parties have dropped figuring and correspondence for the present, for the reason that all finished iron products will sag in February, as they did last year. Angles are $2@$2.30, tees $2.50.

Steel Rails.—It is useless to quote steel rails at $29 or $30, and outside of steel rail offices there is an undue difference of opinion as to whether bottom prices will be $26, $27, or $28. There is but little business.

Old Rails.—Rails are offered at $22 at tide water; No. 1 at $22.50 here.

Pittsburg. Jan. 29.

(From our Special Correspondent.)

Raw Iron and Steel.—The tone of the market has undergone but little change, prices for most descriptions being fairly well maintained. Since the advent of the new year trade has been far from satisfactory, between strikes in existence and others threatened in the near future. This does not fail to have a depressing effect on trade generally. The fact is, there is a lack of confidence in the future, caused by the unsettled condition of affairs. Developments since our last have not confirmed the anticipations of those who are looking for a better market. There is a firmer feeling in spots only, but in others there is a weakness and irregularity which are far from encouraging. Probably the real source of the difficulty is that there is not business enough to go round, and as each one tries to get what there is, prices are made to suffer in some cases. At the same time it certainly appears that the bottom point has been reached. Whether the market will now take an upward turn or not remains for the future to decide. Leading dealers differ in regard to values. One has this to say:

"It seems likely that there will be no higher prices for some months to come. The elements of strength in the present situation are: First the reduction of the output of pig iron, and second more

liberal purchases by consumers. There have been no heavy sales nor any heavy increase in trade, but even a small increase in business is conspicuous at present and is at once accorded significance." The furnaces in the Shenango and Mahoning valleys are still closed and will so remain until matters are satisfactorily arranged between the different parties. The steel rail trade is the most important factor in the iron trade at present. The Bessemer steel mills are the largest consumers of pig iron, and the dullness in rails has been largely responsible for the depression among the furnaces.

The iron manufacturers of the eastern part of the State are considering the advisability of holding a meeting to pass a resolution to close all the blast furnaces in that part of the State. The manufacturers of Western Pennsylvania are said to be in favor of drawing the fires from every furnace in the State, at least for a time. A leading pig-iron man remarked: "We will agree to bank our furnaces if the others will do the same thing, provided all the manufacturers are put under bonds not to start again until it is mutually agreed by all to do so. It is clear to me that there is only one way to save ourselves, and that is by showing the coke men and the railroad companies which charge too high freight rates, that in some instances we can get along without them for a while." It looks like a coke strike. The united mine workers have mailed a circular to the coke operators stating that a strike will be inaugurated February 10th if no settlement of the wage question and other matters is made by February 2d. That the operators will refuse the demand is shown by the coke plants working six days. There are gloomy times ahead.

Coke Smelted Lake and Native Ores.	
2,000 Tons Bessemer, Feb., March	$16.00 cash.
1,000 Tons Bessemer, Feb.	16.00 cash.
1,000 Tons Bessemer Feb., March	15 75 cash.
800 Tons Grey Forge	14.00 cash.
500 Tons Off Bessemer	15.25 cash.
500 Tons Grey Forge, Feb., March	14.50 cash.
500 Tons Grey Forge	14.00 cash.
500 Tons Grey Forge	14.25 cash.
500 Tons Grey Forge	13.85 cash
450 Tons Mottled, all ore	15.00 cash.
200 Tons No. 3 Foundry	15.00 cash.
100 Tons White Iron	13.50 cash.
100 Tons No. 3 Foundry	15.25 cash.
100 Tons No. 2 Foundry	15.25 cash
200 Tons Bessemer	16.00 cash
50 Tons No. 2 Foundry	15.75 cash.
Charcoal.	
110 Tons Warm Blast	24.00 cash.
50 Tons No 3 Warm Blast	22.00 cash.
50 Tons No. 2 Foundry	22.50 cash.
Steel Slabs and Billets.	
1,000 Tons Nail Slabs	25.50 cash.
1,000 Tons Billets and Slabs	25.75 cash.
1,000 Tons Billets and Slabs	26.00 cash.
500 Tons Rod Billets	25.50 cash.
Muck Bar.	
800 Tons Neutral	27.50 cash.
500 Tons Neutral, Feb.	27.25 cash.
200 Tons Neutral	27.50 cash.
200 Tons Neutral	27.75 cash.
Steel Wire Rods.	
1,000 Tons American fives, Domestic at works	37.00 cash.
1,000 Tons American fives, Feb., March.	37.50 cash.
Ferro-Manganese.	
300 Tons 80%, Feb., March, Pittsburg.	61.00 cash.
Steel Bloom Ends.	
700 Tons Bloom Ends	17.00 cash
Skelp Iron.	
200 Tons Sheared Iron	1.75 cash.
185 Tons Wide Grooved	1.85 cash.
120 Tons Narrow Grooved	1.80 cash.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Jan. 30.

These markets during the past week have been singularly devoid of any feature of interest. Some business has been doing, slight demand is noticed, and prices continue almost without exception at our last figures. The tone of the market may be said to be firm. The present dulness is a perfectly normal occurrence, and the maintenance of values indicates the confidence of every one in the trade. No large arrivals of any consequence have been noted. Just sufficient is coming in to supply the current demands of consumers.

Stocks are reported as small, and the barrenness in some lines indicated in our former issues continues without however making itself felt in the price. Arrivals of caustic soda, 77% have been a little larger than heretofore reported. Sodium nitrate remains as quoted in our last, although, of course, the market becomes firmer daily. This stationary condition of values is due to the large amounts of nitrate that were on the market here and nearby at the time the trouble on the West Coast first commenced.

Caustic Soda, 60%.—Small arrivals continue to come in, and most of these go into second hands at once, although some is reported here in stock. The demand remains moderate and is well met by the supply. We quote 3·35@3·37½c. Some business has been done for shipments ahead. 70 to 74%.—This grade continues to come in in fair quantities. Some under contract and some to go on the market. The demand cannot be said to be satisfactory. Some business is doing, but most of it of a jobbing nature. Some orders for future shipment have been placed. Dealers quote 3·12½@3·15c. for spot lots. 77%.—Nothing available for spot delivery is reported in this line. February steam shipments are quoted at from 3·07½@3·10c. The demand continues quite equal to the supply, and arrivals are almost all under contract.

Carbonated Soda Ash, 48%.—The available supply continues small. No large arrivals are reported, and the price remains firm, showing a slight upward tendency, as, it will be remembered, was indicated in our last issue. The demand is not sufficient, however, to have made this very pronounced. Some resales have been noticed. Values range between 1·60c. and 1·62½c. Shipments are quoted a little lower. 58%. The stock continues on a par with the demand—both small. No arrivals are noted and business is dull; prices, 1·52½c.@1·55c.

Caustic Soda Ash, 48%.—If there is one spot in the market which varies a little from the inactivity which is characteristic of the rest, it is the dealing in this article, and of this even it needs an optimistic mind to speak hopefully. Sellers are actually a little stiff-backed. Values range from 1·62½c.@1·65c., and, although business cannot be said to be very brisk, there is at least something doing.

Sal Soda.—Demand shows some signs of increasing. Reports from dealers are not wholly unsatisfactory. The spot supply is said to be small and may eventually cause a stiffening in values. Prices range from 1·07 to 1·12½c., although spot sales have been reported at higher figures Some dealing is done for future delivery. Nothing further is heard of the shortage in the East.

Bleaching Powder.—The demand here continues very slight and the smallest kind of business only is being done. Stocks are small so that values remain firm for spot sales from 1·67½ to 1·75c.

Acids.—No new features enter into this market to make any change worthy of record. Dealers continue to sell whatever they can at very low prices. Hardly any variations in present values can be looked forward to until some of the disquieting element shall have still further lost its influence. Present indications seem to point in that direction. It is now positively affirmed in the trade that whatever slight connection continued to exist between the Knickerbocker Chemical Company and the Passaic Chemical Company has ceased. Unfortunately the representative of the ENGINEERING AND MINING JOURNAL was unable to see any of the gentlemen concerned, so that we are unable, at this writing, to give anything further than the report.

We quote acids per hundred pounds in New York and vicinity: Acetic, $1.65@$2.20; muriatic, 18°, 80c. @$1; muriatic 20°, 90c.@$1.10; muriatic, 22°, $1@ $1.20; nitric, 40°, $3.25@$3.50; some dealers report nothing at all below $3.75, little selling below $4 and most as high as $4.25, or thereabouts. Nitric 42°, $3.50@ $4; sulphuric, 60°, 70c.@80c.; sulphuric, 66°, 75c.@ 90c. According to other reports, most 66° has been getting as high as $1.12½.

Fertilizing Chemicals.—Although business has not been very good, something has been doing right along and dealers speak encouragingly. Our quotations for Charleston rock remain the same: $7@$7.50 f.o.b. vessels; ground, $8@$1.150. Freights continue to be a little unsettled.

There has been a fair demand for sulphate of ammonia; some arrivals have been reported, but stocks remain normal. There has been a slight falling off in values of foreign, some changing hands at 3·09c. and even lower. Gas liquor has found an easy market at 3·15@3·20c and bone liquor continues to be quoted at 3·10@3·15c.

Muriate of potash.—The arrivals during the past week have aggregated 500 tons. Of this fully 300 have gone into consumption, and a fair demand will soon absorb the remainder. Arrivals continue as heretofore with the increase in prices, on account of the ice in the Elbe. During the week Messrs. H. H. Salmon & Co., of this city, agents for the United States and Canada, of the Verkaufs Syndicat der Kalwerke have given their annual circular to the public. Their figures attest the increased favor with which this product is received by consumers.

In 1887 the arrivals in the United States amounted to 17,855 tons, while during the past year they were 29,780 tons. San Francisco, New Orleans and Pensacola are credited with 1,100, 285 and 100 tons respectively for 1890, while in 1887 nothing was shipped to those ports. From their statement of the comparative cost of pure potash contained in the various potash salts, it appears that one pound, when muriate is selling at $1.77½, costs 3·515; for kainit, when selling at $9 per ton, the cost is 3·60; for double manure salts, basis 48%, at $1.10 per 100 pounds, cost is 4·245, and for sulphate of potash, basis 90%, at $2.07. that figure reaches 4·283.

Nitrate of soda.—Continued war news from Chili keeps prices very firm. Sales have aggregated some 20,000 bags and consumers remain anxious as to whether or not they will be able to cover their needs when the spot and nearby supply shall have been exhausted. Shipments have entirely ceased, but dealers are not ready to give credence to reports of probable long continued interruption of trade. The export duty levied on nitrate is understood to have been one of the chief sources from which the Chilean government derived its income. Pisaqua, Iquique, Laleta, Buena, Autofagasta, Tattall and other smaller towns are the chief places from which the salt is exported. The magnitude of this industry is shown by the fact that in 1889 the exports reached 20,606,454 quintals, valued at over $40,000,000, and of this aggregate Iquique shipped 9,661,655 and Pisaqua 8,098,659 quintals. The bulk of this is exported to Europe, less than one-tenth of the product coming to the United States. We quote prices here $1.85 for spot and $1.80 for near by. Sales have been made within the range. One dealer quotes to arrive November, December shipments 1·77½c. and in round lots January and February shipments 1·75c.

Brimstone.—Very little is reported here, with a fair demand, which has resulted in sales to arrive. Values are firm, with every indication of remaining so. Consumption continues steady. We quote best unmixed seconds to arrive near by, $26; thirds, 50@75c. less. The quotations for spot are almost nominal; best unmixed seconds would probably bring $27.50.

London. Jan. 16

(Special correspondence by Couper Millar & Co.)

The severe weather experienced during the last two months has not encouraged buyers to operate in raw materials, but just now there is more inquiry and we look for renewed activity. Considering the paucity of orders it is surprising how well prices of phosphates have been maintained, and this goes to prove the absence of heavy stocks in the hands of shippers. It is true that certain would-be sellers of Florida still entertain the trade with offers of enormous quantities at ridiculously low prices, but, as a rule, these gentlemen are not taken seriously, and after all the warnings from those who have personal experience of the actual state of affairs, if any buyers allow themselves to be mislead by these outsiders they will well deserve it. Our special circular on this subject issued in June last has been more than justified, and we are still waiting for those who promised to put so many thousands of tons on the market to carry out their praiseworthy intentions. The long talked of combination among the nitrate shippers is now said to be effected and the price has advanced about 5s. per ton, not a very great matter when previous value is considered.

Mineral phosphates.—South Carolina River rock still quoted 10½d.@11d. per unit, Canadian 80% at 1s 4d. delivered London, Florida at 13d. on basis of 70%, Somme at 14½d.@15½d. for 70%, and the lower grades at proportionate prices. Belgian can still be bought at comparatively low figures for shipment when the Scheldt, now closed by ice, again becomes navigable.

Bone ash, bones and meal.—A sale of Kurrachee crushed bones is reported at £5 to £5 1s, 3d. per ton, and a cargo of bone ash on private terms. We are now offering degelatinized bone meal containing 60·63% phosphate and 1½ to 2% ammonia, and will be glad to submit quotations.

Sulphate of ammonia is still lower; Beckton price, £10 12s. 6d. per ton.

Nitrate of soda is quoted at £7 15s.

Ammoniacal materials remain unaltered, but little or no business is passing. Ground hoofs and horns quoted 9s. 6d. per unit. Dried blood, 10s. Fish guano, 10s. and 1s. 3d.

Muriate of potash is quoted £7 14s. on 80% in bags. Kainit at 29s. 9d. in bulk f.o.b. Hamburg in quantity. Net cash. Strassfurt weights and sampling. We are informed that the river navigation is closed.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Jan. 30.

A slight increase in values is the chief characteristic in this market, although the demand is so small that any large influx of outside material would weaken prices at once. Stocks here have gradually become smaller, and while no business of any magnitude is heard of, considerable is being done in a jobbing way.

Bricks.—Haverstraws are coming in again in very small quantities and are met by a fair demand. Late dispatches from up the Hudson would indicate that considerable difficulty will be met with in settling matters between employers and the Knights of Labor. Report says that the latter have decreed that every manufacturer of brick along the Hudson must either employ Knights of Labor exclusively or pay $1 a month for every man employed who does not belong to the order. If this demand is persisted in it will doubtless lead to strikes and other troubles, and prove disastrous to all parties concerned Jerseys are coming in in small quantities, and are only placed with difficulty. We quote Haverstraws $6.25@$6.50 per M. Jerseys, $5@ $5.50; pale, $3@$3.50, and $6.25@$7 for Staten Island and Long Island.

Lime.—The long spell of non-production is commencing to have some effect upon prices. A demand fully equal to the supply is noted. Nothing is on its way here, there is nothing down East and none of the kilns, as far as we know, have yet started up. There is quite a scarcity of sea-going vessels and in some cases boats have been chartered from outside trades. Few of the carriers usually employed for lime are sufficiently seaworthy to go out and brave the inclement weather. We quote Rockland common, $1.10; finishing, $1.20; St. John, common and finishing, 85@95c.; Glen Falls, common and finishing, 90c.@$1.10.

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and Amount of last		Dividends. Total paid.	Dividends. Date & amount of last.		
1	Adams, s. L.	Colo.	$1,500,000	150,000	$10	*	.....	.....	$555,000	Jan.	1887	.10
2	Alice, s. c.	Mont.	10,000,000	400,000	25	*	.....	.....	895,000	Dec.	1890	.05
3	Alma&Nel Wood C., G	Idaho	300,000	30,000	10	*	.....	.....	60,000	Jan.	1889	.50
4	American & Nettie, c.	Colo.	.....	300,000	.....	.....	.....	.....	150,000	Nov.	1889	.10
5	Amy & Silversmith, s.	Mont.	.....	341,419	.....	.....	.....	.....	247,530	Aug.	1887	.12½
6	Atlantic, c.	Mich.	1,000,000	40,000	25	$280,000	April	1875	$1.00	700,000	Feb.	1891	1.00
7	Argenta, s.	Nev.	10,000,000	100,000	100	335,000	July	1889	.10	40,000	Feb.	1890	.20
8	Aspen Mg. & S., s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	560,000	Dec.	1890	.10
9	Aurora, I.	Mich.	2,000,000	100,000	20	.....	.....	.....	155,000	Oct.	1887	1.87½
10	Badger, s.	Ont.	250,000	50,000	5	.....	.....	.....	37,500	Mar.	1890	.25
11	Bassick, G. s.	Colo.	10,000,000	100,000	100	*	.....	.....	400,000	Mar.	1884	1.00
12	Belle Isle, s.	Nev.	10,000,000	100,000	100	190,000	Dec.	1889	.15	300,000	Dec.	1879	.25
13	Belcher, G. s.	Nev.	10,400,000	104,000	100	2,476,000	June	1890	.50	15,397,000	April	1876	1.00
14	Bellevue, Idaho, s. L.	Idaho	1,250,000	125,000	10	120,000	Dec.	1889	.25	200,000	Jan.	1890	.10
15	Bi-Metallic, s.	Mont.	5,000,000	200,000	25	.....	.....	.....	410,000	Jan.	1891	.35
16	Bodie Con., G. s.	Cal.	10,000,000	100,000	100	560,000	June	1890	.25	1,602,572	April	1885	.50
17	Boston & Mont., G.	Mont.	2,500,000	250,000	10	*	.....	.....	520,000	June	1886	1.50
18	Boston & Mont., c. s.	Mont.	2,500,000	100,000	25	*	.....	.....	1,575,000	Nov.	1890	1.50
19	Breece, s.	Colo.	5,000,000	200,000	25	*	.....	.....	2,000	Feb.	1890	.01
20	Brooklyn Lead, L. s.	Utah	500,000	50,000	10	.....	.....	.....	127,000	July	1887	.05
21	Bulwer, G.	Cal.	10,000,000	100,000	10	130,000	Aug.	1889	.25	175,000	Jan.	1884	.10
22	Bunker Hill & Sull.	Idaho	3,000,000	300,000	10	*	.....	.....	150,000	Oct.	1883	.06½
23	Caledonia, G.	Dak.	10,000,000	100,000	100	505,000	May	1885	.15	194,000	Oct.	1890	.08
24	Calliope, s.	Colo.	1,000,000	1,000,000	.....	.....	.....	.....	.....	135,000	Dec.	1890	.04½
25	Calumet & Hecla, c.	Mich.	2,500,000	100,000	25	1,200,000	.....	.....	.....	34,350,000	May	1890	5.00
26	Carbonate Hill, s. L.	Colo.	1,500,000	200,000	10	*	.....	.....	.....	30,000	April	1884	.05
27	Carlisle, G.	N. M.	1,000,000	200,000	5	.....	.....	.....	.....	175,000	Dec.	1888	.12½
28	Castle Creek, G.	Idaho	100,000	100,000	1	.....	.....	.....	.....	51,000	Oct.	1883	.03
29	Catalpa, s. L.	Colo.	3,000,000	300,000	10	*	.....	.....	.....	270,000	May	1884	.10
30	Central, c.	Mich.	500,000	20,000	25	100,000	Oct.	1861	.65	1,950,000	Feb.	1890	1.00
31	Chrysolite, s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	.....	1,650,000	Dec.	1884	.25
32	Colorado Central, s.L.	Colo.	2,750,000	275,000	10	*	.....	.....	.....	406,250	Aug.	1889	.05
33	Commonwealth, s.	Nev.	10,000,000	100,000	100	170,000	Nov.	1888	.50	20,000	Nov.	1890	.20
34	Confidence, s. L.	Nev.	.....	24,960	..	328,880	May	1890	.75	199,680	April	1889	1.00
35	Cons. Cal. & Va., G. s.	Nev.	21,600,000	216,000	100	108,000	Jan.	1885	.20	3,466,800	April	1890	.25
36	Contention, s.	Ariz.	12,500,000	250,000	50	.....	.....	.....	.....	12,587,500	Dec.	1884	.25
37	**Cop. Queen Con., c.	Ariz.	1,400,000	140,000	10	.....	.....	.....	.....	210,000	Feb.	1889	.50
38	Crescent, s. L. G.	Utah	15,000,000	600,000	25	*	.....	.....	.....	228,000	Oct.	1888	.03
39	Crown Point, G. s.	Nev.	10,000,000	100,000	100	2,425,000	Sept.	1889	.50	11,288,000	Jan.	1875	2.00
40	Daly, s. L.	Utah	3,000,000	150,000	20	*	.....	.....	.....	1,800,000	Jan.	1891	.25
41	Deer Creek, s. G.	Idaho	1,000,000	200,000	5	*	.....	.....	.....	20,000	June	1889	.05
42	Deadwood-Terra, G.	Dak.	5,000,000	200,000	25	*	.....	.....	.....	$1,000,000	Nov.	1887	.10
43	Derbec B. Grav., G. s.	Cal.	10,000,000	100,000	100	90,000	Dec.	1881	.10	240,000	Oct.	1890	.10
44	Dunkin, s. L.	Colo.	5,000,000	200,000	25	*	.....	.....	.....	390,000	Oct.	1889	.05
45	Dunstone, G. s. L.	Mont.	1,000,000	200,000	5	*	.....	.....	.....	6,000	Nov.	1889	.03
46	Eclipse	Colo.	100,000	100,000	1	.....	.....	.....	.....	20,000	Nov.	1887	.10
47	Elkhorn, G. s.	Mont.	1,000,000	200,000	5	*	.....	.....	.....	196,875	Dec.	1890	.50
48	Empire Lt., G.	Mont.	500,000	100,000	5	.....	.....	.....	.....	70,500	Oct.	1887	.37½
49	Eureka Con., G. s. L.	Nev.	5,000,000	50,000	100	550,000	June	1889	.50	4,892,500	Oct.	1890	.25
50	Evening Star, s. L.	Colo.	500,000	50,000	10	*	.....	.....	.....	1,458,000	Dec.	1889	.25
51	Excelsior, G. s.	Cal.	10,000,000	100,000	100	560,000	Sept.	1885	1.00	975,000	Oct.	1889	.25
52	Father de Smet, G.	Dak.	10,000,000	100,000	100	200,000	Nov.	1878	1.00	1,125,000	Dec.	1885	.20
53	Franklin, c.	Mich.	1,000,000	40,000	25	220,000	June	1871	.....	960,000	Jan.	1889	2.00
54	Freeland, G. s. c.	Colo.	5,000,000	200,000	25	*	.....	.....	.....	190,000	July	1886	.10
55	Garfield Lt., G. s.	Nev.	500,000	100,000	5	.....	.....	.....	.....	95,000	April	1888	.12½
56	Gould & Curry, G. s.	Nev.	10,800,000	108,000	100	3,988,800	Sept.	1890	.25	2,826,000	Oct.	1870	10.00
57	Grand Prize, s.	Nev.	10,000,000	100,000	100	785,000	Jan.	1890	.30	525,000	Jan.	1890	.30
58	Granite, s. L.	Idaho	500,000	500,000	1	*	.....	.....	.....	28,400	Oct.	1889	.02
59	Granite Mountain, s.	Mont.	10,000,000	400,000	25	*	.....	.....	.....	10,600,000	Feb.	1891	.50
60	Green Mountain, G.	Cal.	1,250,000	125,000	10	*	.....	.....	.....	212,000	Nov.	1881	.07½
61	Hale & Norcross, G. s.	Nev.	11,200,000	112,000	100	5,142,800	April	1890	.50	1,162,000	July	1888	.50
62	Hecla Con., s. G. L. C.	Mont.	1,500,000	30,000	50	.....	.....	.....	.....	1,500,000	April	1889	.50
63	Hel'a Mg.& Red, G.s.L.	Mont.	3,315,000	663,000	5	*	.....	.....	.....	197,979	July	1886	.06
64	Holmes, s.	Nev.	10,000,000	100,000	100	370,000	May	1890	.25	75,000	April	1886	.25
65	Holyoke, G. s.	Idaho	200,000	200,000	1	.....	.....	.....	.....	27,000	Feb.	1883	.10
66	Homestake, G.	Dak.	12,500,000	125,000	100	300,000	July	1878	1.00	4,643,750	Jan.	1891	.10
67	Honorine, s. L.	Utah	500,000	250,000	2	37,500	April	1889	.05	125,000	Sept.	1887	.05
68	Hope, s.	Mont.	1,000,000	100,000	10	*	.....	.....	.....	233,252	April	1888	.25
69	Horn-Silver, s. L.	Utah	10,000,000	400,000	25	*	.....	.....	.....	4,200,000	Sept.	1890	.12½
70	Hubert, G.	Colo.	1,000,000	1,000,000	1	*	.....	.....	.....	247,000	Dec.	1889	.00½
71	Idaho, G.	Cal.	310,000	3,100	100	.....	.....	.....	.....	5,235,900	Dec.	1889	5.00
72	Ideal, s. L.	Colo.	1,500,000	50,000	10	.....	.....	.....	.....	15,000	Oct.	1886	.05
73	Illinois, s.	N. M.	100,000	100,000	1	*	.....	.....	.....	45,000	April	1889	.20
74	Independence, s.	Nev.	10,000,000	100,000	100	340,000	Oct.	1886	.20	225,000	Sept.	1879	.25
75	Iron Hill, s.	Dak.	2,500,000	250,000	10	134,000	July	1889	.03	156,250	Nov.	1887	.07½
76	Iron-Silver, s. L.	Colo.	10,000,000	500,000	20	*	.....	.....	.....	2,500,000	April	1889	.20
77	Jackson, G. s.	Nev.	5,000,000	50,000	100	237,500	Nov.	1880	.20	55,000	June	1889	.10
78	Jay Gould.	Mont.	2,000,000	40,000	5	*	.....	.....	.....	459,000	May	1890	.04
79	Jocuistitla, L.	Mex.	2,500,000	250,000	10	.....	.....	.....	.....	1,200,000	Feb.	1885	.50
80	Jumbo, G.	Colo.	2,000,000	200,000	10	.....	.....	.....	.....	35,000	Oct.	1887	.02½
81	Kearsarge, c.	Mich.	1,250,000	50,000	25	190,000	Oct.	1887	1.00	100,000	Jan.	1890	2.00
82	Kentuck	Nev.	3,000,000	30,000	100	406,930	Aug.	1890	.30	1,350,000	Dec.	1886	.10
83	La Plata, s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	610,000	Sept.	1882	.30
84	Leadville Con., s. L.	Colo.	4,000,000	400,000	10	*	.....	.....	.....	4,423,000	April	1889	.05
85	Lexington, G. s.	Mont.	4,000,000	40,000	100	*	.....	.....	.....	609,000	Jan.	1885	2.00
86	Little Chief, s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	.....	820,000	Dec.	1890	.05
87	Little Pittsburg, s. L.	Colo.	20,000,000	200,000	100	*	.....	.....	.....	1,050,000	Mar.	1890	.50
88	Little Rule	Colo.	500,000	500,000	1	.....	.....	.....	.....	110,000	Jan.	1891	.02
89	Mammoth	Utah	10,000,000	400,000	25	110,000	.....	1883	.25	760,000	Jan.	1890	.10
90	Martin White, s.	Nev.	10,000,000	100,000	100	1,225,000	Oct.	1890	.25	140,000	Dec.	1886	.25
91	Mary Murphy, G. s.	Colo.	350,000	3,500	100	*	.....	.....	.....	175,000	May	1888	5.00
92	Matchless, s.	Colo.	500,000	500,000	1	*	.....	.....	.....	15,000	Feb.	1890	.00½
93	May Mazeppa	Colo.	1,000,000	100,000	1	.....	.....	.....	.....	70,000	Dec.	1890	.01
94	Minnesotta, c.	Mich.	1,000,000	40,000	25	420,000	April	1886	1.00	1,820,000	Mar.	1876	.....
95	Mono, G.	Cal.	5,000,000	50,000	100	760,000	Sept.	1890	.25	12,500	Mar.	1886	.25
96	Montana, G. s.	Mont.	3,300,000	660,000	5	*	.....	.....	.....	2,489,667	Oct.	1890	.06
97	Morning Star, s. L.	Colo.	1,000,000	100,000	10	*	.....	.....	.....	850,000	Dec.	1889	.20
98	Moulton, s. G.	Mont.	2,000,000	400,000	5	*	.....	.....	.....	380,000	Dec.	1887	.07½
99	Mount Pleasant, G.	Cal.	150,000	150,000	1	*	.....	.....	.....	150,000	Feb.	1887	.30
100	Mt. Diablo, s.	Nev.	5,000,000	50,000	100	137,500	June	1880	2.00	160,000	Oct.	1889	.20
101	Napa, Q.	Cal.	700,000	100,000	7	.....	.....	.....	.....	400,000	Jan.	1891	.10
102	Navajo, G. s.	Nev.	10,000,000	100,000	100	500,000	April	1890	.15	365,000	April	1889	.10
103	New Gaston, s.	Colo.	500,000	100,000	5	*	.....	.....	.....	397,500	April	1890	.50
104	N. Hoover Hill, G. s.	N. C.	300,000	120,000	2½	*	.....	.....	.....	30,000	Dec.	1885	.06½
105	Northern Belle, s.	Nev.	5,000,000	50,000	100	425,000	Jan.	1884	8.00	2,400,000	April	1883	.50
106	North Belle Isle, s.	Nev.	10,000,000	100,000	100	395,000	April	1890	.20	230,000	May	1888	.50
107	North Star, G.	Cal.	1,000,000	100,000	10	.....	.....	.....	.....	250,000	Dec.	1889	.50
108	Ontario, s. L.	Utah	15,000,000	150,000	100	.....	.....	.....	.....	11,600,000	Jan.	1891	.50
109	Ophir, G. s.	Nev.	10,000,000	100,000	100	4,210,640	April	1890	.50	1,500,000	July	1882	1.00
110	Original, s. C.	Mont.	1,500,000	60,000	25	*	.....	.....	.....	123,000	July	1888	.05
111	Oro	Colo.	500,000	100,000	5	*	.....	.....	.....	60,000	June	1890	.20
112	Osceola, c.	Mich.	1,250,000	50,000	25	480,000	April	1876	1.60	1,447,500	Dec.	1890	1.50
113	Oxford, G.	N. S.	125,000	125,000	1	*	.....	.....	.....	28,500	Sept.	1888	.02
114	Paradise Valley, G. s.	Nev.	10,000,000	100,000	100	57,000	April	1888	.15	150,000	April	1887	.10
115	Parrot, c.	Mont.	1,800,000	180,000	10	.....	.....	.....	.....	696,000	Sept.	1890	.10
116	Peacock, s. G.	Nev.	2,000,000	200,000	10	*	.....	.....	.....	60,000	Nov.	1886	.....
117	Plumas Eureka, G.	Cal.	1,406,250	140,625	10	*	.....	.....	.....	2,548,046	Oct.	1889	.37½
118	Plutus, G. s. c. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	20,000	Feb.	1886	.10
119	Plymouth Con., G.	Cal.	5,000,000	100,000	50	*	.....	.....	.....	2,280,000	Feb.	1888	.40
120	Quicksilver, pref., Q.	Cal.	4,300,000	43,000	100	.....	.....	.....	.....	1,705,791	Aug.	1890	1.50
121	" com., Q.	Cal.	5,700,000	57,000	100	.....	.....	.....	.....	843,867	July	1882	.40
122	Quincy, c.	Mich.	1,000,000	40,000	25	200,000	Dec.	1882	.....	5,770,000	Feb.	1891	5.00
123	Republic, c.	Mich.	5,000,000	100,000	50	400,000	Dec.	1889	.30	4,312,587	June	1887	1.25
124	Richmond, s. L.	Nev.	1,350,000	54,000	25	*	.....	.....	.....	99,785	Feb.	1880	.50
125	Ridge, c.	Mich.	500,000	20,000	25	219,939	Mar.	1886	.50	585,000	Mar.	1886	.05
126	Robinson Con., s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	.....	100,000	Dec.	1882	.50
127	Robert E. Lee, s. L.	Colo.	10,000,000	500,000	20	*	.....	.....	.....	4,460,000	July	1869	3.00
128	Savage, s.	Nev.	11,200,000	112,000	100	6,604,000	Nov.	1889	.50	7,500	April	1882	.01
129	Shoshone, s.	Idaho	150,000	150,000	1	.....	.....	.....	.....	1,568,145	April	1888	.12½
130	Sierra Buttes, G.	Cal.	2,225,000	122,500	10	.....	.....	.....	.....	102,000	Jan.	1871	1.00
131	Sierra Nevada, G. s.	Nev.	10,000,000	100,000	100	6,296,910	May	1890	.50	270,000	April	1889	.10
132	Sierra Nevada, s. L.	Idaho	1,000,000	1,000,000	1	*	.....	.....	.....	40,000	May	1889	.02
133	Silver Cord, G. s. L.	Colo.	4,500,000	450,000	10	.....	.....	.....	.....	270,000	April	1889	.10
134	Silver King, s.	Ariz.	10,000,000	100,000	100	130,000	Nov.	1890	.30	1,950,000	July	1887	.25
135	Silver Mg. of L. V.	Colo.	500,000	500,000	1	*	.....	.....	.....	225,000	Dec.	1890	.05
136	Silverton, G. s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	50,000	Jan.	1881	.25
137	Small Hopes Con., s.	Colo.	5,000,000	250,000	20	*	.....	.....	.....	3,162,500	Oct.	1890	.10
138	Spring Valley, G.	Cal.	200,000	200,000	1	50,000	Oct.	1886	.25	3,595,000	June	1888	.05
139	Standard, G. s.	Cal.	10,000,000	100,000	100	100,000	June	1890	.50	155,000	Nov.	1881	.05
140	Stormont, s.	Utah	1,500,300	500,000	1	*	.....	.....	.....	844,000	Dec.	1887	.20
141	St. Joseph, L.	Mo.	1,500,000	150,000	10	*	.....	.....	.....	1,974,000	Dec.	1890	.02
142	Swansea, G.	Colo.	600,000	60,000	10	*	.....	.....	.....	100,000	Nov.	1881	.20
143	Tamarack, c.	Mich.	1,000,000	40,000	25	520,000	April	1885	3.00	1,670,000	Oct.	1890	4.00
144	Tombstone, G. s. L.	Ariz.	12,500,000	500,000	25	*	.....	.....	.....	1,250,000	April	1882	.10
145	United Verde, c.	Ariz.	3,000,000	300,000	10	*	.....	.....	.....	97,500	Feb.	1884	.10
146	Valencia M.	N. M.	150,000	1,500	100	*	.....	.....	.....	41,250	April	1886	2.50
147	Viola Lt., s. L.	Idaho	750,000	150,000	5	.....	.....	.....	.....	272,500	Oct.	1887	.37½
148	Ward Con., s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	20,000	Dec.	1889	.05
149	Yankee Girl	Colo.	2,500,000	250,000	10	*	.....	.....	.....	1,275,000	July	1887	.10
150	Yellow Jacket, G. s.	Nev.	12,000,000	120,000	100	5,508,000	Mar.	1889	.50	2,148,000	Aug.	1871	1.50
151	Weeb City, L. L.	Mo.	55,000	11,000	5	.....	.....	.....	.....	4,400	July	1889	.10
152	Woodside	Utah	.....	.....	.....	.....	.....	.....	.....	25,000	Oct.	1889	.25
153	Young America	Cal.	.....	.....	.....	.....	.....	.....	.....	175,000	.....	1889	.10

G., Gold. S., Silver. L., Lead. C., Copper. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid $1,400,000. ‡ Non-assessable for three years. § The Dead wood previously paid $275,000 in eleven dividends, and the Terra $75,000. Previous to the consolidation in August, 1884, the California had paid $31,320,000 in dividends, and the Con. Virginia $40,000,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid $1,350,000 in dividends.

NON-DIVIDEND PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and am't of last.		
1	Agassiz Cons., s. L.	Colo.	$2,500,000	50,000	$50	*	.....	.....	.....
2	Allegheny, s.	Colo.	5,000,000	500,000	10	.....	.....	.....	.....
3	Allouez, c.	Mich.	2,000,000	80,000	25	$787,000	Jan.	1890	.70
4	Alpha Con., G. s.	Nev.	3,000,000	30,000	100	112,500	Sept.	1890	.25
5	Alta, s.	Nev.	10,080,000	100,800	100	3,359,800	Sept.	1890	.50
6	Amador, G.	Cal.	400,000	200,000	2	*	.....	.....	.....
7	American Flag, s.	Colo.	1,250,000	125,000	10	900,000	June	1887	.....
8	Amity, s.	Colo.	250,000	250,000	1	.....	.....	.....	.....
9	Anglo-Montana, Lt.	Mont.	600,000	120,000	5	.....	.....	.....	.....
10	Astoria, G.	Cal.	200,000	100,000	2	.....	.....	.....	.....
11	Barcelona, G.	Nev.	5,000,000	200,000	25	*	.....	.....	.....
12	Bechtel Con., G.	Cal.	10,000,000	100,000	100	173,500	Jan.	1883	.10
13	Belmont, s.	Nev.	5,000,000	50,000	100	735,000	April	1886	.10
14	Best & Belcher, G. s.	Nev.	10,080,000	100,800	100	2,279,375	Aug.	1890	.25
15	Big Pittsburg, s. L.	Colo.	20,000,000	200,000	100	*	.....	.....	.....
16	Black Oak, G.	Cal.	3,000,000	300,000	10	*	.....	.....	.....
17	Boston Con., G.	Cal.	10,000,000	100,000	100	170,000	Nov.	1888	.25
18	Bremen, s.	N. M.	5,000,000	500,000	10	*	.....	.....	.....
19	Brownlow, s.	Colo.	250,000	250,000	1	.....	.....	.....	.....
20	Brunswick, G.	Cal.	2,000,000	400,000	5	*	.....	.....	.....
21	Bullion, G. s.	Nev.	10,000,000	100,000	100	2,790,000	Dec.	1889	.25
22	Butte & Boston, c. s.	Mont.	5,000,000	200,000	.....	.....	.....	.....	.25
23	Calaveras, G.	Cal.	500,000	500,000	1	*	.....	.....	.....
24	Carisa, G.	Wy.	500,000	100,000	5	*	.....	.....	.....
25	Carupano, G. s. L. C.	Ven.	200,000	100,000	2	*	.....	.....	.....
26	Cashier, G. s.	Colo.	500,000	250,000	2	*	.....	.....	.....
27	Charles Dickens, G. s.	Idaho	1,250,000	250,000	5	*	.....	.....	.....
28	Cherokee, G.	Cal.	1,500,000	150,000	10	.....	.....	.....	.....
29	Chollar, s.	Nev.	11,200,000	112,000	100	1,540,000	Nov.	1889	.50
30	Cleveland, T.	Dak.	1,000,000	500,000	2	*	.....	.....	.....
31	Colchis	N. M.	500,000	50,000	10	.....	.....	.....	.....
32	Comstock, G.	Nev.	10,000,000	100,000	100	35,000	Mar.	1887	.15
33	Con. Imperial, G. s.	Nev.	5,000,000	50,000	100	1,875,000	July.	1890	.05
34	Con. Pacific, G.	Cal.	6,000,000	60,000	100	198,000	June	1890	.10
35	Con. Silver, s.	Mo.	2,500,000	250,000	10	.....	.....	.....	.....
36	Crescent, s. L.	Colo.	3,000,000	300,000	10	*	.....	.....	.....
37	Crocker, s.	Ariz.	10,000,000	100,000	100	150,000	June	1890	.15
38	Crowell, G.	N. C.	500,000	500,000	1	.....	.....	.....	.....
39	Dahlonega, G.	Ga.	250,000	250,000	1	*	.....	.....	.....
40	Dandy, s.	Colo.	5,000,000	500,000	10	*	.....	.....	.....
41	Decatur, s.	Colo.	1,500,000	300,000	5	*	.....	.....	.....
42	Denver City, s. L.	Colo.	5,000,000	500,000	10	*	.....	.....	.....
43	Denver Gold, G.	Colo.	300,000	60,000	5	*	.....	.....	.....
44	Durango, G.	Colo.	500,000	500,000	1	*	.....	.....	.....
45	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar.	1886	1.00
46	El Cristo, G. s.	U.S.C.	1,000,000	500,000	2	*	.....	.....	.....
47	El Dorado, G.	Cal.	1,000,000	250,000	4	*	.....	.....	.....
48	El Talento, G.	U.S.C.	1,000,000	500,000	2	*	.....	.....	.....
49	Empire, s.	Utah	10,000,000	100,000	100	.....	.....	.....	.....
50	Eureka Tunnel, s. L.	Nev.	10,000,000	100,000	100	*	.....	.....	.....
51	Exchequer	Nev.	10,000,000	100,000	100	865,000	July.	1890	.25
52	Found Treasure, G. s.	Nev.	10,000,000	100,000	100	81,500	May	1890	.25
53	Gogebic I. Syn., I.	Wis.	5,600,000	200,000	25	.....	.....	.....	.....
54	Gold Cup, s.	Colo.	500,000	500,000	1	*	.....	.....	.....
55	Golden Era, s.	Mont.	2,000,000	200,000	10	*	.....	.....	.....
56	Gold Placer, G.	Colo.	5,000,000	200,000	25	229,314	Dec.	1886	.25
57	Gold Ridge, G.	Cal.	1,000,000	500,000	2	*	.....	.....	.....
58	Goodshaw, G.	Cal.	10,000,000	100,000	100	*	.....	.....	.....
59	Grand Belt, c.	Tex.	12,000,000	120,000	100	.....	.....	.....	.....
60	Grand Duke	Colo.	800,000	80,000	10	.....	.....	.....	.....
61	Great Romance, G.	U.S.C.	1,000,000	500,000	2	*	.....	.....	.....
62	Gregory-Bobtail, G.	Colo.	550,000	550,000	1	*	.....	.....	.....
63	Gregory Con., G.	Mont.	3,000,000	300,000	10	.....	.....	.....	.....
64	Harlem M. & M. Co., G.	Cal.	1,000,000	200,000	5	*	.....	.....	.....
65	Head Cent. & Tr., s. G.	Ariz.	10,000,000	100,000	100	.....	.....	.....	.....
66	Hector, G.	Cal.	1,500,000	300,000	5	45,000	Jan.	1889	.15
67	Highland, c.	Mich.	500,000	25,000	20	.....	.....	.....	.....
68	Holywood	Cal.	200,000	100,000	2	.....	.....	.....	.....
69	Hortense, s.	Colo.	2,000,000	200,000	10	.....	.....	.....	.....
70	Hudson, c.	Mich.	1,000,000	40,000	25	280,000	May	1887	3.00
71	Iron, Gold & Silver, s.	N. M.	2,000,000	200,000	10	*	.....	.....	.....
72	Ironton, I.	Wis.	1,000,000	40,000	25	.....	.....	.....	.....
73	Iroquois, c.	Mich.	1,250,000	50,000	25	.....	.....	.....	.....
74	J. D. Reymert	Ariz.	10,000,000	100,000	100	..

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Jan. 24.		Jan. 26.		Jan. 27.		Jan. 28.		Jan. 29.		Jan. 30.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams	1.80												100
Alice											1.90		100
Atlantic, Mich					14.13								50
Belcher, Nev													
Belle Isle													
Bodie Cons., Cal					.95				.95				200
Bos. & Mont., Mont	41.25								39.50				70
Breece, Colo													
Bulwer, Cal							.25						200
Caledonia			.55	.50						.55			500
Calumet & Hecla, Mich	247½								250½				25
Catalpa, Colo													
Chrysolite, Colo													
Colorado Cen.,Con.,Colo													
Cons. Cal. & Va., Nev			4.00				4.00						500
Crown Point, Nev	1.80								1.90				350
Deadwood, Dak							.75						100
Dunkin, Colo	.65												100
Excelsior, Cal													
Father de Smet													
Franklin					16.25								40
Freeland, Colo	.18	.16							.17		.18		3,403
Gould & Curry, Nev							2.50						100
Hale & Norcross, Nev													
Holyoke													
Homestake, Dak											9.00		30
Horn-Silver, Utah			2.85	2.80							3.00	2.95	1,250
Independence, Nev													
Iron Hill, Dak													
Kearsarge							11.38						100
Leadville C., Colo													
Little Chief, Colo									.35		.34		200
Mono, Cal													
Moulton, Mont													
Mt. Diablo, Nev													
Navajo, Nev													
N. Belle Isle, Nev			.50		.40								150
Ontario, Utah													
Ophir, Nev			3.35										150
Osceola, Mich					45.50								20
Plymouth, Cal			2.00				2.00		2.00		2.50		720
Quicksilver, Pref													
" Com													
Quincy, Mich													
Robinson Cons., Colo													
Savage							2.25						100
Sierra Nevada, Nev											2.30		100
Silver Cord													
Silver King, Ariz									.20				200
Silver Mg. of L. V							1.05						350
Small Hopes													
Standard	1.45				1.45						1.40		500
Stormont, Utah													
Tamarack, Mich											146½		20
Yellow Jacket, Nev			2.30				2.35				2.60		300

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Jan. 24.		Jan. 26.		Jan. 27.		Jan. 28.		Jan. 29.		Jan. 30.		SALES
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alpha, Nev													
Alta, Nev	.70		.70		.65		.70		.75		.89		1,300
American Flag, Colo									.05				100
Andes, Nev													
Amador, Cal			.06	.04									800
Astoria, Cal	.05	.04			.05	.04	.04		.04		.04		4,400
Belmont, Cal	.31		.31		.31		.31		.31		.31		1,800
Best & Belcher, Nev			2.65	2.50			2.65						300
Bonanza King, Cal													
Brunswick, Cal	.10	.08	.10										2,500
Bullion, Nev													
Butte & Bost., Mont													
Castle Creek, Idaho													
Challar, Nev	2.20		2.20				2.20						300
Col. & Beaver, Idaho													
Commonwealth, Nev													
Comstock T., Nev			.15		.15				.16				3,600
" bonds													
" scrip													
Con. Imperial, Nev													
Cons. Pacific, Cal													
Crescent, Colo													
Del Monte, Nev													
El Cristo, Rep. of Col	.52						.52		.50				300
Exchequer													
Hollywood, Cal													
Huron, Mich	3.13				3.38		3.13				3.25		500
Julia, Nev	.30				.30				.20				1,300
Justice, Nev													
King. & Pembroke	.50												500
Lacrosse, Colo													
Lee Basin, Colo													
Mexican, Nev	2.40		2.50				2.50				2.75		400
Middle Bar	.05		.06	.04	.08	.05	.07		.04				5,700
Monitor, Colo													
Mutual Sm. & Mg. Co	1.45		1.45		1.45		1.50	1.45	1.50		1.50		1,500
Nevada Queen, Nev													
N. Commonwealth, Nev													
Occidental, Nev	.80				.80								500
Oriental & Mil., Nev													
Overman, Nev													
Phœnix of Ariz	.64						.64				.64		400
Phœnix Lead, Colo					.13								100
Potosi					5.00								100
Rappahannock													
S. Sebastian													
Scorpion											.35		200
Seg Belcher, Nev											1.40		100
Silver Queen													
Sullivan Con., Dak													
Sutro Tunnel, Nev													
Tioga, Cal													
Union Cons., Nev													
Utah, Nev			.89				.85		.85		2.35		100
													500

*Ex dividend. †Dealt in at the New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 10,055. Non-dividend shares sold 27,300.
Total, New York, 37,355.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Jan. 23.		Jan. 24.		Jan. 26.		Jan. 27.		Jan. 28.		Jan. 29.		SALES.
Atlantic, Mich	14.00	13.25	14.00	13.75					14.00		15.00	14.00	875
Bodie, Cal													200
Bonanza Development			.51						.55		.60	.57½	500
Bost. & Mont., Mont	40.50	40.00	40.50	40.00	40.50	40.00	40.00				41.75	40.00	1,841
Breece, Colo					.35								400
Calumet & Hecla, Mich					250				250				25
Catalpa, Colo	.30		.90		.42½	.40	.42½	.40	.42½		.40	.35	4,925
Central, Mich													
Chrysolite Colo													
Con. Cal. & Va., Nev													
Dunkin, Colo													
Eureka, Nev													
Franklin, Mich	16.00	15.75	16.50	16.00	16.00		16.50		16.50	16.00	17.00	16.50	960
Honorine, Utah													
Horn Silver, Utah													
Kearsarge									11.63	10.50	11.50		55
Little Chief, Colo													
Little Pittsburg, Colo													
Moulton													
Napa, Cal													
Ontario, Utah													
Osceola, Mich	34.50	34.00	34.50		34.75	34.25	34.50		34.50		36.50	35.00	1,245
Pewable, Mich													
Quincy, Mich	100	95.00	103	100	105		105	100			105	101¼	300
Ridge, Mich													
Sierra Nevada, Nev													
Silver King													
Stormont, Utah													
Tamarack, Mich	140		144		143		145	143	145		145		127
Tecumseh, Mich													

NAME OF COMPANY.	Jan. 23.		Jan. 24.		Jan. 26.		Jan. 27.		Jan. 28.		Jan. 29.		SALES.
Allouez, Mich	2.00				2.00		2.00		2.00		2.06		1,335
Arnold, Mich									.45				200
Aztec, Mich													
Brunswick, Cal													
Butte & Boston, Mont	15.00	14.38			15.00	14.50			15.00		15.00		330
Centennial, Mich			15.00						15.25				105
Comstock, T., Nev													
Copper Falls Mg													
Crescent, Colo									.15				1,000
Dana, Mich													
Don Enrique, N. M									.16				500
El Cristo, S. A													
Hanover, Mich													
Humboldt, Mich													
Hungarian, Mich													
Huron, Mich			3.25	3.00	3.25								250
Mesnard, Mich													
National, Mich	3.25								3.25	3.00	3.00		1,110
Native, Mich													
Oriental & M., Nev													
Phoenix													
Pontiac													
Rappahannock, Va													
Santa Fe, N. Mex	.50				.60	.50	.60	.57½	.62½		.62½		8,200
Shoshone, Idaho													
South Side, Mich													
Star													
Washington, Mich													
Winthrop, Mich													

Boston: Dividend shares sold, 11,253. Non-dividend shares sold, 13,140. Total Boston, 24,393.

San Francisco Mining Stock Quotations.

COMPANY.	CLOSING QUOTATIONS.					
	Jan. 23.	Jan. 24.	Jan. 26.	Jan. 27.	Jan. 28.	Jan. 29.
Alpha						
Alta	.60	.60	.55	.55		
Belcher						
Belle Isle			.50	.25		
Best & Bel	2.55	2.40	2.50	2.50		
Bodie	.90	.90	.85	.55		
Bulwer	.20	.20	.20	.20		
Challar	2.10	2.10	2.15	2.20		
Com'wealth	.80	.80	.75	.75		
Con. C. & V	3.85	3.80	4.05	4.05		
Con. Pacific						
Crown Point	1.70	1.70	1.70	1.75		
Eureka C			2.50	2.50		
Gould & C	2.50	2.35	2.50			
Grand Prize						
Hale & N	1.45	1.45	1.50	1.40		
M. White						
Mexican	2.30	2.40	2.50	2.35		
Mono	.55	.60	1.60	.55		
Mt. Diablo			1.90			
Navajo	.55	.50	.20	.20		
Nev. Queen	.25	.25	.25	.25		
N. Belle Isle	.50	.45	.25	.45		
N.Com'w'lth						
Ophir	3.10	3.20	3.25	3.20		
Potosi	4.50	4.50	4.85	4.95		
Savage	2.15	2.10	2.15	2.20		
Sierra Nev	1.70	1.75	1.75	1.75		
Union Con	1.90	1.85	1.90	1.90		
Utah	.75	.70	.70	.75		
Yello w Jak	2.20	2.20	2.15	2.25		

COAL STOCKS.

NAME OF COMPANY.	Par val. of shares.	Jan. 24.		Jan. 26.		Jan. 27.		Jan. 28.		Jan. 29.		Jan. 30.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
American Coal														
Cambria Iron														
Cameron Coal & I.Co														
Ches. & O. RR	100													
Chic. & Ind. Coal RR	100													
Do. pref	100													
Col. C. & I	100	34			34½	34		35½	35¼	36½		36	35¼	37¼	36½	1,720
Col. & Hocking C. I.	100													
Consolidation Coal	100													
Del. & H. C	100	133⅛	132½	133	132½			135½	134	134¾	134½	134⅜	134¼	2,202
D., L. & W. RR	50	137⅛	136¾	136⅞	134⅞	136⅞	134¾	138¼	136⅝	137⅝	136¾	137¾	137	71,649
Hocking Valley	100			26½	25⅞	26½		28	25½	25¾		26½		1,550
Hunt. & Broad Top										19½				34
Do. pref			44½		44		44		44¼					232
Illinois C. & Coke Co														
Lehigh C. & N	50	47⅞	47⅝	48	47¾	47¾	47⅝	47⅞	47¾	47¾	47½			524
Lehigh Valley RR	50	50⅝	50½	50¾		50¾	50⅝	50¾	50⅝	50¼				825
Lehigh & Wilk. Coal	100													
Mahoning Coal	100											85		40
Do. pref	100											105		10
Maryland Coal						16⅛		15½						200
Morris & Essex	100									145				6
New Central Coal	50			11½										10
N. J. C. RR	100			111⅞	106	110½	108½	111½	110½	111	110½	110½		6,055
N. Y. & S. Coal	100													
N. Y., Susq. & West	100					8¼	8¼	8⅜		8¼				1,280
Do. pref	100	31¾		32	31	31½								650
N. Y. & Perry C. & I	100													
Norfolk & West. RR	50			16										100
Do. pref	50											55¼	55	120
Penn. Coal	50													
Penn. RR	50	51⅞		51⅞	51¾	51¾	51¾	52	51¾	51⅞	51¾			1,050
Ph. & R. RR		32½		32¼	31	31¾	31½	32⅝	32			32¼	32	**11,898
Sunday Creek Coal														
Do. pref	100													
Tennessee C. & I. Co		36		36	35	37	34¾	36½	35¾					2,925
Do. pref														
Westmoreland Coal														

**Sales in New York, 7,300; in Philadelphia, 4,598. Total sales, 103,080.

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid. L. H.	Asked. L. H.
Atlantic Coal	.90	$1.50
Balt. & N. C.	.07@.08	.10@.12
Big Vein Coal	90	1.10
Conrad Hill	....	.10
Cons. Coal	.23½@.24	.28
Diamond Tunnel	....	....
George's Crk. C.	1.10	1.12@1.13
Lake Chrome	....	....
Maryland & Charlotte	....	....
North State	....	....
Silver Valley	.50@.70	.65@.80

Prices bid and asked, lowest and highest, during the week ending January 29.

Birmingham, Ala. Jan. 28.

COMPANY.	Bid. L. H.	Asked. L. H.
Ala. Coal & I. Co.	....	$100
Ala. Conn. C. & C. Co.	....	$23
Ala. R. Mill Co.	$100	....
*Alice Furnace	$104	....
Anna Howe G. Mg. Co.	$⅛	$⅜
Bessemer Land	$27¾	$28¼
Bir. Mg. & Mfg.	....	$35
Cahaba Coal Mg. Co.	....	$61
Camille Gold Mg. Co.	$½	....
De Bardeleben C. & I. Co.	$48	....
Decat. L. Imp.	$9	$10
Decatur Min. L.	....	$19
Ensley Land	$7¼	$7½
*Eureka	....	....
Florence L. & Mg. Co.	....	$18¼
Gadsen Land	$4	$4¼
Hecla Coal Co.	....	....
Hen. S. & M. Co.	....	$10
Jagger-Townl'y C. & C. Co.	$8½	$10
Mag-Ellen	$100	....
Mary Lee C. & R. Co.	....	$25
Sheffield C. & I. Co.	....	$41½
Sloss I. & S	$20	$25
†Sloss I. & S	$86	$86½
‡‡ Sloss I. & S.	$49	$51
Tuscaloose C. I. & L. Co.	....	$24
Ten. C. & I. Co.	$36	$36½
" pref.	$83	$85
Vulcan C. & C. Co.	$5	....
Woodstock I. Co.	....	$30

* Bonds. † First mortgage. ‡‡ Second mortgage. ** Without interest.

Pittsburg, Pa. Jan. 28.

COMPANY.	B.	A.	Closing.
Allegheny Gas Co.	$.....	$.....	$..
Bridgewater Gas Co.	....	....	....
Chartiers Val. Gas	9.00	11.00	9.00
Columbia Oil Co.	2.00	3.00	2.50
Consignee Mg. Co.	.30	.....	.50
Consolidated Gas Co.	.....	.....	.....
East End E. Light Co.	.....	.....	.....
East End Gas Co	.....	.....	.....
Forest Oil	.....	.....	.....
Hazlewood Oil Co.	.....	.....	.....
La Noria Mining	.....	.....	.....
Luster Mg. Co.	19.00	21.00	19.38
Mansfield C. & C. Co.	.....	.....	.....
Manuf'turers Gas Co.	20.50	25.00	23.00
Nat. Gas Co. of W. Va	.....	.....	.....
N. Y. & Clev. Gas Coal.	.....	.....	.....
Ohio Valley Gas	.....	25.00	25.00
Pennsylvania Gas	.....	.....	.....
People's Natural Gas.	.....	.....	..
People's N. G. & P. Co.	6.00	7.75	6.50
Philadelphia Co.	10.25	12.00	10.75
Pine Run Gas Co.	.....	.....	.....
Pittsburg Gas	.....	.....	.....
Silverton Mg. Co.	.....	.....	.....
South Side Gas.	.....	.....	.....
Tuna Oil Co.	.....	65.00	60.00
Union Gas.	.....	.....	.....
Washington Oil Co.	.....	.....	.....
W'house Brake Co.	.....	68.00	68.00
W'house A. B. Co.	90.00	100.00	95.00
W'house E. Light.	7.13	9.00	8.25
W'moreland & Camb.	.....	.....	.....
Wheeling Gas.	14.50	16.00	16.00
Yankee Girl Mg	.....	.....	.....

St. Louis. Jan. 28.

CLOSING PRICES.

COMPANY.	Bid.	Asked.
Adams, Colo.	$.....	$1.95
American & Nettie	.41¼	.50
Aztec, N. Mex.	.08	.....
Bi-Metallic	....	.....
Central Silver	.06½	.07½
Cleveland, Colo.	.....	.....
Cleveland & An'r.	.....	.....
Coeur d'Alene	.....	.....
Elizabeth	2.50	2.55
Gold King	.08	.10½
Granite Mountain, Mont.	.....	.....
Hope	.....	.....
Ingram	.....	.....
I. X. L., Colo.	.....	.....
La Union	.02	.02½
Little Albert	.15	.....
Montrose Placer, Colo.	.47½	.50
Major Budd, Mont.	.....	.....
Mexican Imp.	.....	.....
Mickey Breen	.80	.82½
Mountain Key	.....	.....
Nellie	.....	.....
Old Colony	.....	.....
Pat Murphy, Colo.	.03	.04
Puzzle	.....	.....
Richmond Hill	.....	.....
Samoa	.....	.....
Silver Age, Colo.	1.45	.....
Small Hopes, Colo.	.85	.....
Tourtelotte	.....	.....
West Granite, Mont.	.....	.....
Wire Patch	.13½	.15
Yuma, Ariz.	.46¼	.50

Trust Stocks. Jan. 30.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.

Am. Cotton Oil. Tr. Repts	$18 @	$18½
Cattle Trust	... @	....
Distillers' & Cattle Feeders'.	46⅞@	47¼
Linseed Oil	40 @	40½
National Lead	19¾@	19⅞
Standard Oil	160½@	162
Sugar Refineries, Tr. repts	84⅞@	85

Trust Receipts.

Sales at the New York Stock Exchange week ending Jan. 30:

	Sales.	Price H.	Price L.
*American Cotton Oil	745	21½	19¾
National Lead	22,142	20⅜	19⅛
*Sugar	29,870	85	77

* Trust receipts.

Foreign Quotations.

London. Jan. 16.

COMPANY.	Highest.	Lowest.
Almada, Mex.	2s.	1s. 9d.
Amador, Cal.	8s. 6d.	6s. 6d.
Appalachian, N. C.	6d.	3d.
Canadian Phos., Can.	£1½	£1¼
Colorado, Colo.	3s. 3d.	2s. 9d.
Comstock, Utah.	....	....
Cordova	....	....
Cons. Esmeralda, Nev.	2s. 6d.	2s.
Denver Gold, Colo.	6d.	....
Dickens Custer, Idaho.	1s.	9d.
East Arevalo, Idaho.	2s.	1s.
El Callao, Venezuela	....	....
Elmore, Idaho	1s. 3d.	9d.
Garfield, Nev	1s. 3d.	9d.
Jay Hawk, Mont.	1s. 6d.	1s.
Josephine, Cal.	1s.	6d.
Kohinoor, Colo.	2s. 3d.	1s. 9d.
La Luz, Mex.	1s. 9d.	1s. 3d.
La Valera, Mex.	25s.	20s.
Montana Lt., Mont.	16s.	14s.
New California, Colo.	5s. 3d.	4s. 9d.
New Consolidated	9d.	3d.
New Eberhardt, Nev.	1s.	6d.
New Emma, S. Utah.	2s. 10½d.	2s. 7½d.
Newfoundland, N. F.	3s. 6d.	3s.
N. Gold Hill, N. C.	3s.	2s. 6d.
New Guston, Colo.	£3¼	£2¾
New Hoover Hill, N.C.	1s.	6d.
Old Lout, Colo	....	....
Palmarejo, Mex.	12s. 6d.	12s.
Pinos Altos, Mex.	5s. 9d.	5s. 3d.
Pittsburg Cons., Nev.	7s. 9d.	7s. 3d.
Richmond Con., Nev.	£1½	£1¼
Ruby & Dunderb'g, Nev.	1s.	6d.
Sam Christian, N. C.	1s.	6d.
Sierra Buttes, Cal.	5s.	4s.
" Plumas Eur., Cal.	£⅝	£½
Sonora, Mex.	....	....
United Mexican, Mex.	6s.	5s.
U. S. Placer, Colo.	6d.	3d.
Viola Lt., Idaho	1s. 6d.	1s.
Yankee Girl, Colo.	17s. 6d.	16s. 6d.

Paris. Jan. 15.

	Francs.
Belmez, Spain	860.00
Callao, Venez	41.00
Callao Bis., Venez	14.00
East Oregon, Ore	5.25
Forest Hill Divide, Cal.	.....
Golden River, Cal.	130.00
" " parts	30.00
Lexington, Mont	105.00
" parts	3.00
Rio Tinto, Spain	577.50
Tharsis, Spain	156.25

CURRENT PRICES.

Those quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—Acetic, ℔ 100 lbs. $1.75@$2.00
Muriatic, 18° ℔ 100 lbs. .80@1.00
Muriatic, 20° ℔ 100 lbs. .90@1.10
Muriatic, 22° ℔ 100 lbs. 1.00@1.20
Nitric, 36° ℔ 100 lbs. 4.00@4.29
Nitric, 42° ℔ 100 lbs. 3.50@4.00
Oxalic, ℔ 100 lbs. 6.50@10.50
Sulphuric, 60° ℔ 100 lbs .70@.80
Sulphuric, 66° ℔ 100 lbs. .75@.90
Alkali—
Refined, 48 p. c. 1.60@1.65
Refined, 58° 1.55@1.50
Alum—Lump, ℔ lb. .04
Ground, ℔ lb. 05
Lump ℔ ton, Liverpool £4 17 6
Sulphate of Alumina, ℔ ton £4 10
Ammonia—Sul., ℔ 100 lbs. 3.15
Carb, ℔ lb. 7½@8½
Aqua Ammonia—18° ℔ lb. 4¾
20°, ℔ lb. .6
22°, ℔ lb. 6@7
26°, ℔ lb. 10@11
Ammoniates—Azotine, ℔ unit 1 95@ 2 06
Blood, dried, red, ℔ unit, west 1 80@ 1 00
low grade, ℔ unit. 1 70@ 1 80
Concentrated tankage, ℔ unit 1 75@ 1 80
Bones, rough, ℔ ton. 20 00@23 00
ground, ℔ ton. 25 00@28 00
Bone black, refuse, ℔ ton 17 50@19 50
Kieserite 6 00@ 6 50
Fish guano, dried 18 50@19 00
acidulated 10 00@— 00
wet 8 50@ 9 50
Phosphate rock, f. o. b Char'n 6 00@ 7 25
undried —@ 6 —
dried 7 00@ 7 50
ground 8 00@11 50
Acid phosphate, 14% per unit. 72½@ 75
Arsenic—White, powdered ℔ lb. 3¼@3½
Red ℔ lb. 5¾@ 6
White at Plymouth, ℔ ton £12 2 6
Asbestos—Am., ℔ ton $50@$300
Italian, ℔ ton. c. i. f. L'pool £18@£60
Ashes—Pot, 1st sorts, ℔ lb. 4¾@4⅞
Pearl 6¼@6½
Asphaltum—P. ton. 13.00
Prime Cuban. ℔ lb. 4½@5½c.
Hard Cuban, P ton $28.00
Trinidad, refined, ℔ ton $30.00
Egyptian 8@9
Barium—Nitrate, ℔ lb. 8@8½
Barytes—Sulph., Am. prime white 17@20
Sulph., foreign, floated, ℔ ton. 19½@21.50
Sulph., off color, ℔ ton. 11.50@14.00
Carb., lump, f. o. b. L'pool, ton £6
No. 1, Casks, Runcorn, " " £4 10 0
No. 2, bags, Runcorn, " " 3 15 0
Bleach—Over 35 p. c. ℔ lb. 1.85@1.90
Borax—Refined, ℔ lb. 9½@9⅝
Concentrated 7¾@8¾
Refined " Liverpool ℔ ton £29
Brimstone—*See Sulphur.*
Bromine—℔ lb. .37@38
Chalk—℔ ton. 1.75
Precipitated, ℔ lb. 4¾@5
China Clay—English, ℔ ton 13.50@18.50
Southern, ℔ ton. 13.50
Chrome Yellow—℔ lb. 10@2
Cobalt—Oxide, ℔ lb. 2.60@2.90
Copper—Sulph. English Wks. ton £20@£21
Copperas—Common, ℔ 100 lbs. 70
Best, ℔ 100 lbs. 75@1.00
Liverpool, ℔ ton, in casks £1 15s.
Corundum—Powdered, ℔ lb. 4½@.9
Cream of Tartar—Am. 99% 22½
Powdered, 99 p. c. 23
Emery—Grain, ℔ lb. 4½@5
Flour, ℔ lb. 2¾@3½
Feldspar—Ground, ℔ ton. 15.00
Fuller's Earth—Lump, ℔ bbl. 90@95
Powdered, ℔ lb. 1⅞@2
Gypsum—Calcined, ℔ bbl. 1.25@1.50
Iodine—Resublimed 2.75
Kainit—℔ ton. $9.75@$10
Kaolin—*See China Clay.*
Lead—Red, ℔ lb. 6¾@9
White, American, in oil, ℔ lb. 6¾@7¼
White, English, ℔ lb. 8½@8¾
Acetate, or sugar of, white 12@13
Nitrate 9@10
Lime Acetate—Amer. Brown .95@1.00
" Gray 1.75@1.87½
Litharge—Powdered, ℔ lb. 6½@6¾
English flake, ℔ lb. 9@9½
Magnesite—Greek, ℔ ton. 20.00
Manganese—Crude, per unit. 23@28
Oxide, ground, per lb. 2½@6½
Mercuric Chloride—(*Corrosive Sublimate*) ℔ lb. 70@72
Metallic Paint—Brown per ton. $20@25
Red $20@25
Mineral Wool—℔ lb. 2
Mica—In sheets according to size.
1st quality, ℔ lb. 25@$6.00
Naphtha—Black 60
Ochre—Yellow, "B. F.," ℔ ton, f. o. b. mill 30.00
"J. F. L. S.," ℔ lb. ex dock 2½
Yellow 10@25
Rochelle 1.35@1.50
Washed Dutch .5@—
Washed French 1⅝@2½
Washed Nat Oxford, Lump 6½@6¾
Washed Nat Oxford, Powder 7@7½
Golden 3¾@4
Domestic 3¼@1½
Domestic, for O. C. & W. P. ⅝@1
Oils, Mineral
Cylinder, light filtered 15@20
Dark filtered 14@21
Extra cold test —@—
Dark steam refined 10@18
Phosphate Rock—S. Carolina, per ton f. o. b. Charleston 6.00@7.25
Ground, ex vessel New York 11.00
Canadian Apatite, rump, f. o. b. at Montreal, ℔ ton 16.00
Phosphorus—℔ lb. 64@65
Precip., red 100@102
white 100@103
Plumbago—Ceylon, ℔ lb. 4@5
American, ℔ lb. 5@7
Potassium—Cyanide, ℔ lb 39@40
Bromide, ℔ lb 33
Chlorate, English, ℔ lb 11@14
Chlorate, powdered 13@14
Carb, ℔ lb. 4.70@5.54
Caustic, ℔ lb. 7½@8
Iodide 2.65@2.70
Muriate, ℔ 100 lbs. 1.82½
Nitrate, refined, ℔ lb. 6@8
Bichromate, ℔ lb. 10½@11
Dble. m'ure salt, basis of 48@50%. 1.07½
Sulphate, basis of 90% ℔ 100 lbs. 2.05
Yellow Prussiate 17½@18
Red Prussiate 42@45
Pumice Stone—Select lumps, lb. 3¼
Original cks., ℔ lb 1¾@2
Powdered, pure, ℔ lb. 2¼@2½
Pyrites—Non-cupreous, p. units 10d.
Quartz—Ground, ℔ ton. 14.00@16.00
Rotten Stone—Powdered, ℔ lb. 3¼@3½
Lump, ℔ lb. 6@10
Salt—Liverpool, ground, ℔ sack 75@80
Turk's Island, ℔ bush. 25@28
Salt Cake—℔ lb. 70@75
Saltpeter—Crude, ℔ lb. 5¼@5½
Refined, ℔ lb. 6@8
Silex, ℔ ton. 14@25
Soda—Carb Ash, 48% 1.60@1.65
" high test 1.55@1.60
Caustic ash, 48% 1.62½@1.65
" high test 1.60
Newcastle, 48% — @ —
" high test 1.50@1.55
Bicarb, English 3.50@3.75
" American 3@3½
Crystal, carbonate 1.95@2.00
Caustic, 60% 3.40@5.50
" 70% 3.15@3.20
" 74% 3.15@3.20
" 77% 3.25@3.37½
Sal, English 1.17½@1.20
" American 1.10@1.15
Nitrate 1.80@1.85
Prussiate 17½@18
Phosphate 7@18
Stannate 8@15
Strontium—Nitrate, ℔ lb. 9@9½
Sulphur—Roll, ℔ lb. 1¾
Flour, ℔ lb. 20
Crude Brimstone, 2s., ℔ ton. 27 00
Crude Brimstone, 3ds, ℔ ton. 26.50
Sylvinit, 23@27%, S. F. P., per unit. 40@42½
Talc—Ground French, ℔ lb. 1¼@1½
Domestic, ℔ ton $18@$20
c. i. f. Liverpool, ℔ ton £4 5
Terra Alba—French 80@85
English 75@80
American, No. 1 —@—
American, No. 2 40@50
Tin—Crystals 15½@16
Muriate .8@ 3
Vermillion—American, ℔ lb. 61
English ℔ lb. 82@85
Vitriol—(Blue), Ordinary, ℔ lb. 5½@5⅝
Extra, ℔ lb. 7
Zinc Oxide—Am., Dry, ℔ lb. 4½
Antwerp, Red Seal, ℔ lb. 6@6½
Paris, Red Seal, ℔ lb 6½@7
* Spot.

THE RARER METALS.

Aluminum—(Metallic), per lb. $1.50@$2
Sheet, per lb 2.50
Arsenic—(Metallic), per lb .40
Barium—(Metallic), per gram 4.00
Bismuth—(Metallic), per lb. 2.75
Cadmium—(Metallic), per lb. 1.00
Calcium—(Metallic), per gram 10.00
Cerium—(Metallic), per gram. 7.50
Chromium—(Metallic), per gram. 1 00
Cobalt—(Metallic), per lb. 6.00
Didymium—(Metallic), per gram. 9.00
Erbium—(Metallic), per gram. 7.50
Gallium—(Metallic), per gram 140.00
Glucinum—(Metallic), per gram. 12.00
Indium—(Metallic), per gram. 9.00
Iridium—(Metallic), per oz. 7.00
Lanthanum—(Metallic), per gr. 10.00
Lithium—(Metallic), per gram 10.00
Magnesium—Per lb. 4.50
Manganese—(Metallic), per lb. 1.10
Chem. pure, per oz. 10.00
Molybdenum—(Metallic), per gm .50
Niobium—(Metallic), per gram 5.00
Osmium—(Metallic), per oz. 65.00
Palladium—(Metallic), per oz. 35.00
Platinum—(Metallic), per oz. 20.00@25.00
Potassium—(Metallic), per lb. 28.00
Rhodium—(Metallic), per gram. 5.00
Ruthenium—(Metallic), per gm. 5.50
Rubidium—(Metallic), per gram. 2.00
Selenium—(Metallic), per oz. 1.80
Sodium—(Metallic), per lb. 2.50
Strontium—(Metallic), per gm. .60
Tantallum—(Metallic), per gram. 9.00
Telurium—(Metallic), per lb. 5.00
Thallium—(Metallic), per gram. .25
Titanium—(Metallic), per gram. 2.25
Thorium—(Metallic), per gram. 17.00
Tungsten—(Metallic), per oz. 2.25
Uranium—(Metallic), per lb. 5.00
Vanadium—(Metallic), per gm. 22.00
Yttrium—(Metallic), per gram. 9.00
Zirconium—(Metallic), per oz. 65.00

BUILDING MATERIAL.

Bricks—Pale, ℔ 1,000. 3.00@3.50
Jerseys, ℔ 1,000. 4.75@5.25
Up Rivers, ℔ 1,000. 5.00@5.50
Haverstraw seconds, ℔ 1,000. 5.50@6.00
Haverstraw firsts, ℔ 1,000. 6.00@6.25
Fronts, nominal, ℔ 1,000
Croton 14.00@16.00
Wilmington 20.00@21.00
Philadelphia @22.00
Trenton @22.00
Baltimore
Building Stone—Amherst freestone, ℔ cu. ft. 95@1.00
Brownstone, ℔ cu. ft. 1.00@1.35
Granite, rough, ℔ cu. ft. 45@1.25
Granite, Scotch, ℔ cu. ft. 1.00@1.15
Cement—Rosendale, ℔ bbl. 85@1.10
Portland, American, ℔ bbl 2.15@2.45
Portland, foreign, ℔ bbl. 2.40@2.50
Portland, " special brands 2.60@2.85
Roman, ℔ bbl. 2.75@2.90
Keene's coarse, ℔ bbl. 4.50@5.50
Keene's fine, ℔ bbl. 7.25@8 50
Slate—Purple and green roofing, ℔ 100 ft. 7.00@7.50
Red roofing, ℔ 100 sq. ft. 12.00
Black roofing, ℔ 100 sq. ft. 4.25@5.50
Lime—Rockland, common, ℔ bbl. .90
Rockland, finishing, ℔ bbl. 1.10
St. John, com. and finish., ℔ bbl. 85@ .90
Glens Falls, com. and fin., ℔ bbl. 85@1.10
Labor—Ordinary, ℔ day 1.50@2.00
Masons, ℔ day 4.00
Plasterers, ℔ day 4.00
Carpenters, ℔ day 3.50
Plumbers, ℔ day 3.50
Painters, ℔ day 2.50@3.50
Stonesetters, ℔ day 3.50@4.00
Tilelayers, ℔ day 3.50@4.50
Bricklayers, ℔ day 4.0